MODERN PLASTICS

NOVEMBER 1954

MILLIONS for MODELS...Page 89

What IRRADIATION can do for Plastics...Page 131

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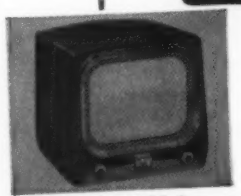

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Happy are we that the *gem of plastics* looms so large this holiday season. May it also serve to forecast a *big* and merry Christmas for you!

*Emenee Musical Toys, Emenee Industries, Inc., 200 Fifth Ave., New York 10.

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MODERN PLASTICS*

November 1954 • Vol. 32 No. 3

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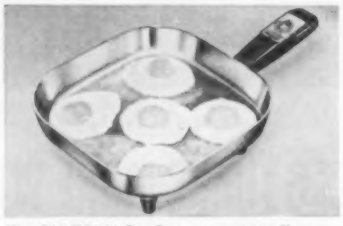

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EDITORIAL

Beware Exploitation by Ignorance

The relatively new field of vacuum forming thermoplastics sheets has an obvious glamour for inexperienced men with very little capital. The fact that it is literally possible to buy or build some kind of vacuum forming device for as little as $1000.00 and put it to work in an empty garage or a basement is a great attraction. The fact that it is possible to produce some kind of vacuum formed piece out of some kind of material on very low-cost and quickly produced tools, is another.

Since the field is so open to "exploitation by ignorance," a very serious danger threatens both the thermoplastics industry proper and prospective industrial end users of vacuum formed components. This danger is the greater because at purchaser level the end user frequently does not know enough about the materials and the processes of vacuum and drape forming to buy carefully, and is led to buy on a price basis instead of using engineering criteria. Thus these unsophisticated end users can do to themselves and allow to be done to them much damage by inadvertently fostering managerial and engineering inefficiency on the part of hungry small plastics processors.

At this early stage in the development of this new phase of plastics processing, we must issue a warning to all concerned. Vacuum forming is destined to be a great new field for plastics. In its full development it will be a field wherein large and automatic equipment will provide mass production of quality plastics components. And, as the field matures the need for larger capital, better engineering, and better management in vacuum forming plants will cause the "garage" operator to fall by the wayside.

Unfortunately for many small entrepreneurs who are leaping into what looks like an easy and simple business, unfortunately for end users who don't realize the need for proper tooling and proper pricing, but fortunately in the end for the industry as a whole, the field of vacuum forming is every bit as complicated from an engineering and production standpoint as any other phase of plastics processing. Well designed and properly engineered equipment, geared to quantity production, must be used in connection with well designed and precision built forming tools and finishing tools if good parts are to be made by this process. That costs money, requires the best of engineering and design talent, and must be supported by sound salesmanship and good management.

We must warn men with limited capital and insufficient engineering experience that if they skip lightly into this new field, the chances of eventual success are slight. And we must advise industrial end users of vacuum formed plastics to study carefully the facilities, finances, and engineering abilities of any prospective supplier in this field.

In Plastics Reducing Machinery, Look to CUMBERLAND for the COMPLETE LINE

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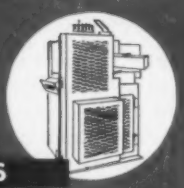

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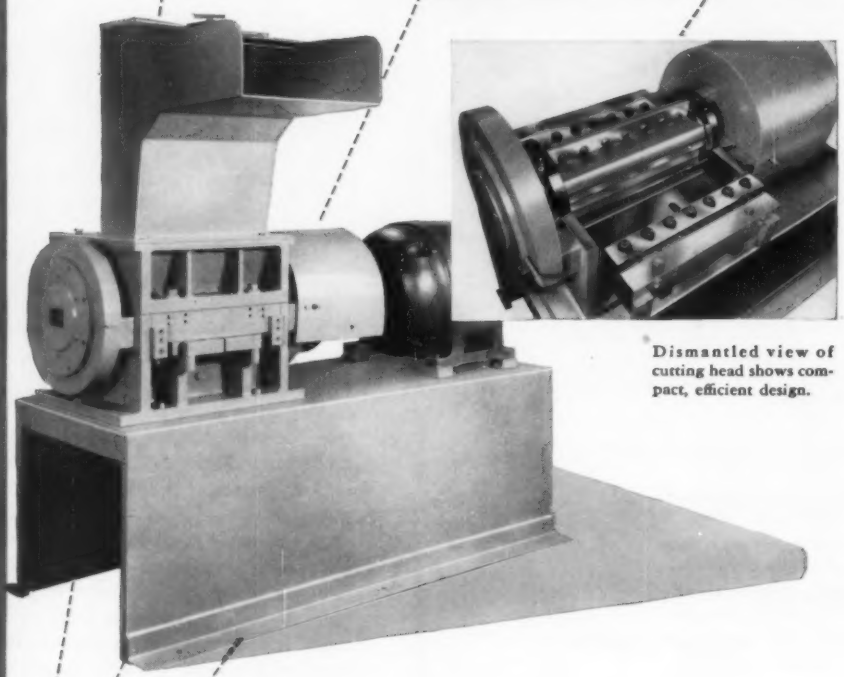

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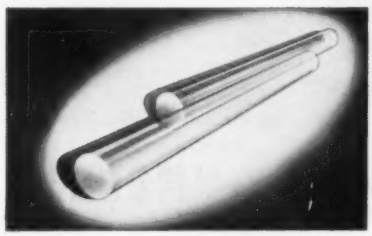

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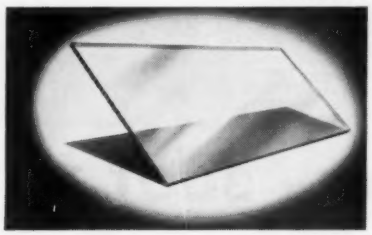
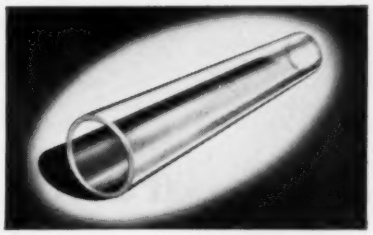


TUBES



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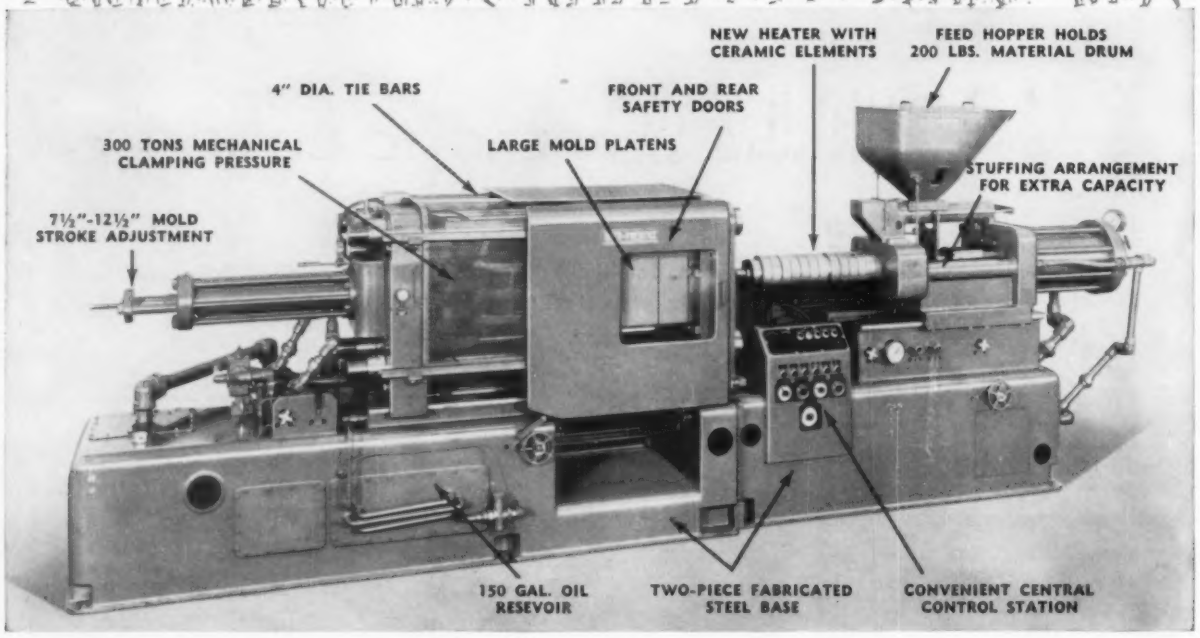
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4 more examples of

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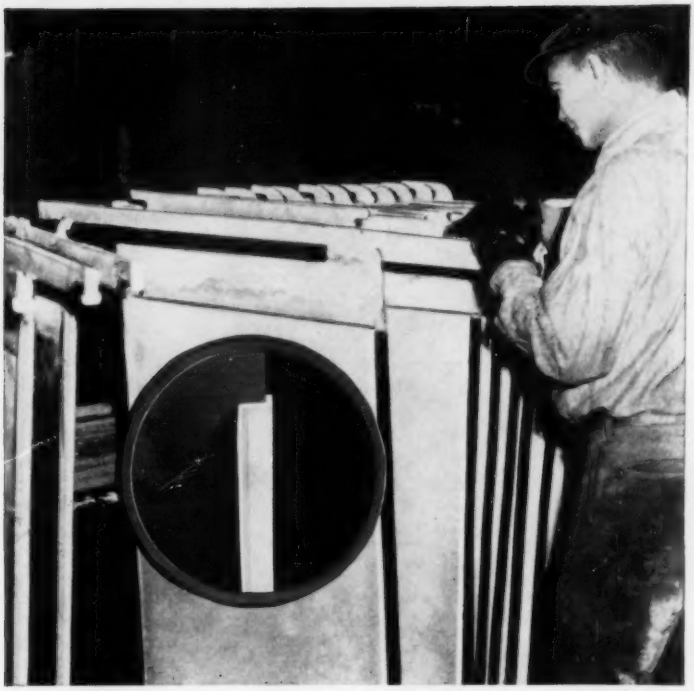
"TEFLON"* tetrafluoroethylene resin has a durable, permanently waxy surface. This unique non-adhesive property is utilized in a new self-inker band stamp, used to price or code-mark merchandise. The anvil on which the porous-rubber ink band rides is extrusion-formed of filled "Teflon." Wear resistance is also important for this application. In a test, the anvil of "Teflon" showed no wear after 500,000 revolutions. (Anvil manufactured by Dixon Corporation, Bristol, Rhode Island.)

"ZYTEL"† nylon resin is molded into many consumer items of high quality. This salad fork and spoon set of black "Zytel" and silverplate is both handsome and practical. It is lightweight and resists wear. If accidentally dropped, the "Zytel" won't crack or break. (Set manufactured by Oneida Ltd., Oneida, New York; molded by Shaw Insulator Co., Irvington, New Jersey.)

"ALATHON"* polyethylene resin in extruded form improves the zinc stripping operation for one large company. The material formerly used to separate zinc deposits from aluminum cathodes would rot and swell

"ZYTEL" for an attractive salad set that is impervious to foodstuffs, can be boiled, and is light in weight.



"ALATHON" for a cathode strip that is corrosion-resistant, keeps flexible for a tight snap fit.

advanced product engineering

from the zinc sulfate solution. Switching to chemical-resistant "Alathon" solved this problem. Flexible "Alathon" goes on the edge of the cathode with a tight snap fit. (Cathode strip manufactured for Anaconda Copper Mining Co., Great Falls, Montana by Anchor Plastics Co., Inc., Long Island City, New York.)

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Investigate the properties of the Du Pont family of engineering materials. The applications described on these pages are typical of the product improvement possible when design and service requirements are evaluated in terms of these unique engineering materials. For further information on the properties and uses of these materials, use the coupon or write to E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 3011, Du Pont Building, Wilmington 98, Delaware.

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Please send me more information on the Du Pont engineering materials checked: ☐ "Teflon" tetrafluoroethylene resin; ☐ "Lucite" acrylic resin; ☐ "Alathon" polyethylene resin; ☐ "Zytel" nylon resin. I am interested in evaluating these materials for

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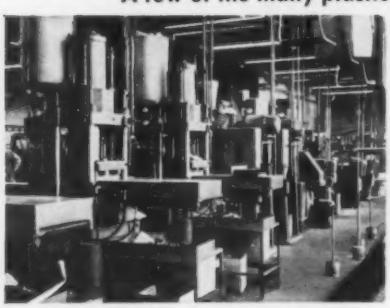
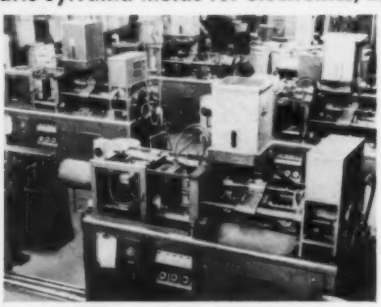
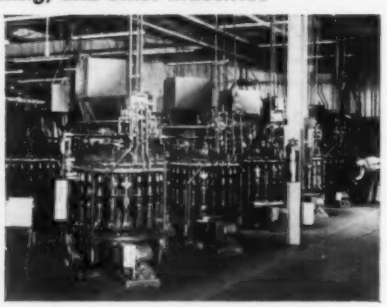
A few of the many plastic parts Sylvania molds for electronics, lighting, and other industries



Sylvania's automatic compression molding presses range in capacity from 15 to 150 tons.



Sylvania injection molding presses with capacities from 4 to 48 ounces.



Sylvania's rotary type compression molding presses.

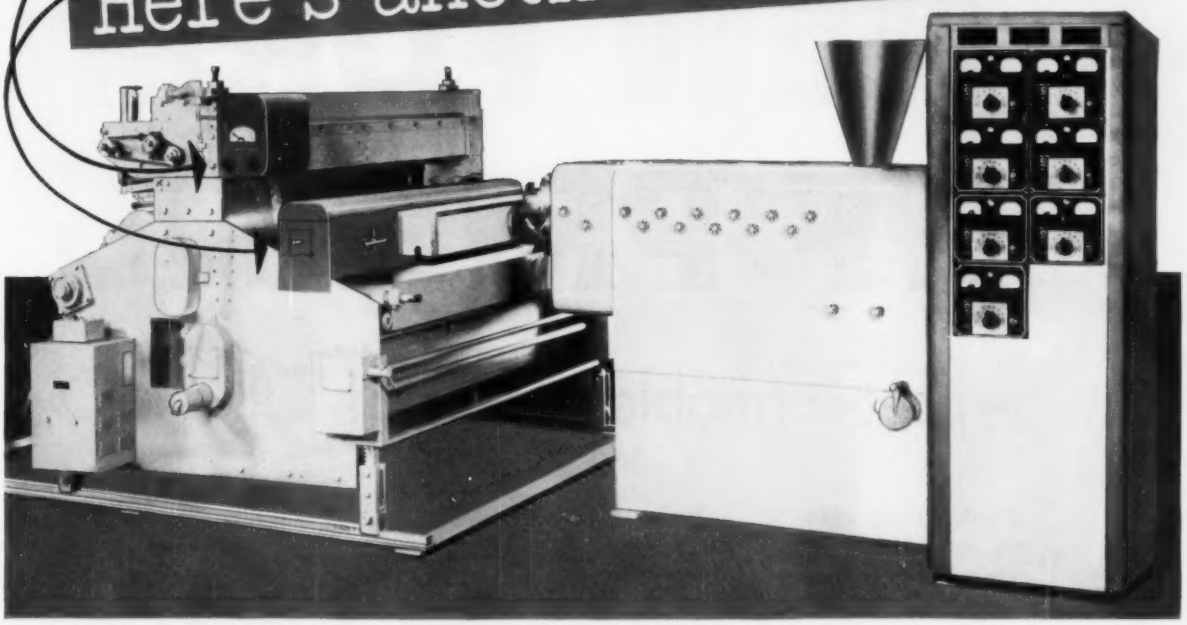
In Canada:
Sylvania Electric (Canada) Ltd.
University Tower Bldg.
St. Catherine St., Montreal, P. Q.

SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

LIGHTING • RADIO • ELECTRONICS • TELEVISION

Here's another MPM First!



designed to give polyethylene a printable surface

NEW MPM-Traver unit pre-treats film electronically

● By application of a new electronic process, the MPM-Traver Pre-treatment Unit ends a problem which has long perplexed producers of polyethylene film. The unit is a simple-to-use, light-weight set-up which, at low cost, makes the surface of flat sheet or tubing printable.

The unit modifies the surface of a polyethylene film by bombarding it electronically. Yet, the other chemical and physical characteristics are unchanged. The simplicity and complete effectiveness of the MPM-Traver method outmodes other treatment systems.

The unit can be installed on the take-up, as illustrated above, to treat the film as it is extruded. Or the treatment unit can be brought to bear on the film at any subsequent time. Once treated, the polyethylene can be printed at any time by any recognized printing method.

Look at these important advantages:

- **Versatility**—will treat any extruded width of film and gauge of material
- **Simplicity**—only casual monitoring needed; easy to set up and operate
- **Safety**—interlocked for operator safety; current cuts off when threading; no fires or open flames required; complies with Underwriter's code
- **Dependability**—the unit, engineered and manufactured with the fine precision and skill that goes into every MPM product, is the most advanced pre-print treatment commercially available

MPM holds the exclusive manufacturing rights to this polyethylene pre-printing treatment equipment. You can get further information and make arrangements for a demonstration by writing the manufacturer today.

mpm modern plastic machinery corp.
15 Union St., Lodi, N. J.
cable address: MODPLASEX

West Coast Representative
4113 West Jefferson St., Los Angeles 16, Calif.

NEW FORM OF PROFITS

—post-formable sheets of Plio-Tuf

Post-forming offers you promising, new profits in the form of high-quality products at low fabricating costs. Particularly so, when you use PLIO-TUF—the unique high styrene copolymer that's now available in wide calendered or extruded sheets.

Inexpensive equipment. Low tooling costs. Fast setup times. Adaptability. Less-skilled labor. High rates of production. These are the advantages which add up to the profits generally available from post-forming on either long or short runs. However, these profits can be increased substantially through the outstanding properties of PLIO-TUF.

Over and above the usual properties of the usual thermoplastic resins—hardness, stiffness, lightness, warmth and attractive colors—PLIO-TUF possesses unmatched resistance to impact and surprising resistance to distortion by heat. Chemical, electrical and aging properties also are above average, yet PLIO-TUF can and does post-form readily by either mechanical or vacuum drawing.

Especially interesting—and indicative of its forming characteristics—is the ability of PLIO-TUF to be deep-drawn. Laboratory tests (see inset) and trial production runs have proved that PLIO-TUF can be drawn to a depth of nine inches or more without rupture—another plus advantage and one seldom found in highly impact-resistant materials.

Why not probe the possibilities of post-forming sheets of PLIO-TUF at the first opportunity? You'll find they add up to premium profits on products of premium quality. Source of PLIO-TUF sheets and full technical help are yours by writing: Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

TOPS IN DEEP DRAWING: Here's proof that PLIO-TUF is unmatched by other highly impact-resistant materials in its ability to be deep-drawn by vacuum or mechanical forming. The test piece shown was mechanically drawn by the ring and clamp method to a depth of 9 inches without rupture.

Photo courtesy of Auto-Vac Company, Fairfield, Conn.

B&J No. ½ TD

MEDIUM CAPACITY GRANULATOR

Grinds accumulated scrap, large area rejects small purges and small bleeder scrap

UP TO 500 POUNDS AN HOUR

GUARANTEED TO CUT POLYETHYLENE
or any elastomeric material without fluffing

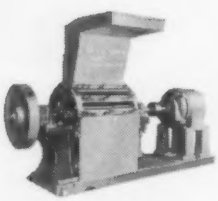
The B & J No. ½ TD has proven itself to be the best grinder in its class . . . providing high speed production, sturdy construction, and low-cost operation in a machine which occupies only 3′8″ x 3′11″ of floor area. V-belt driven, the No. ½ TD is powered by either a 7½ or 10 HP motor. The regular model has a 5½″ x 20″ throat opening which is sufficient for most needs. Where a larger throat opening is required, the No. ½ TD Model 451, with an 8″ x 20″ throat opening, is available.

No. ½ TD
EXCELLENT FOR RE-GRINDING TRIM SCRAP AND REJECTS OF VACUUM FORMED PARTS

Such as refrigerator panels, automotive panels, aircraft instrument panels, food trays, etc.

STANDARD IDEAL

3½"x10" throat opening. 2 or 3 HP motor. Capacity up to 250 lbs. an hour.



No. 1

7"x24" throat opening. 10 or 15 HP motor. Capacity up to 700 lbs. an hour.

There's a B & J machine to meet every need. Tell us your requirements and send samples of your material for grinding in our testing laboratory. Write for brochure describing our many different size machines.

Leaders in Granulating Machinery for a Half Century

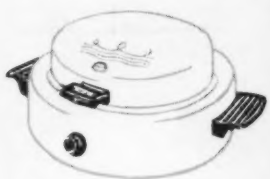
BALL & JEWELL, INC.

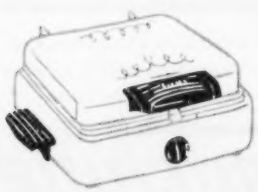
22 FRANKLIN STREET **EVergreen 9-6580** **BROOKLYN 22, NEW YORK**

hold on to sales appeal

WITH **HANDLES** BY KURZ-KASCH

KURZ-KASCH "handles" other Dominion Products, too!





The handle's your customer's first contact with your product. Many times the sale can be made—or lost—at this crucial moment. Your designers know how to design sales appeal into a handle. Help them hold on to their design by bringing it to Kurz-Kasch.

Dominion Electric Corporation does. Over the past few years, Dominion has repeatedly turned to Kurz-Kasch for their custom phenolic handles. From coffeemakers to wafflebakers and sandwich grills, Dominion found K-K engineers able, ready and willing to engineer and mould phenolic handles—light, low cost, with heat insulation aplenty and lots of sales appeal!

To boost your sales appeal, let Kurz-Kasch "handle" your product. Write, wire or phone today for more complete information concerning K-K *custom* moulding.

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NEW CAMACHINE®

500

SLITTER-REWINDER

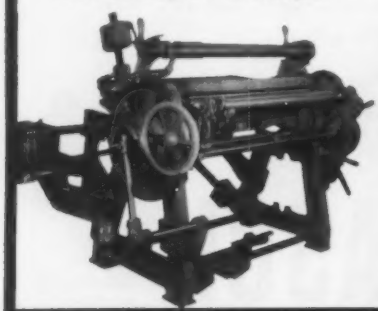
. . . for any type of film, foil, paper or fabric

Converts quickly from score-cut to shear-cut or razor-type slitting. Features panel board control. Trim widths to 62". Rewound rolls to 20" dia. Speeds to 2000 fpm.*

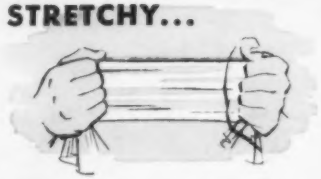
SLIPPERY...

Camachine Model 26-7

Especially equipped for handling slippery materials such as cellophane. Three-point web control is provided through automatic constant tension unwind, driven feed rolls, and differential rewinding. Trim widths to 62". Rewind rolls to 16" dia. Speeds to 450 fpm.*

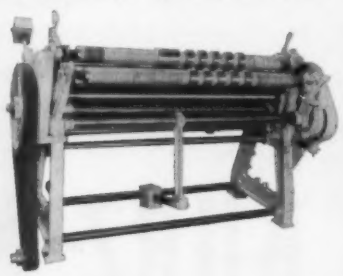


STRETCHY...



Camachine Model 26-R-7

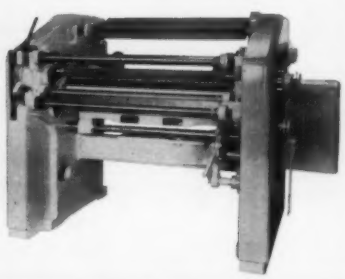
For stretchy materials such as polyethylene and other light gauge films. Razor-type slitting elements may be quickly replaced or respaced. Features an integral electrically braked mill roll shaft. Trim widths to 62". Rewound rolls to 17¾". Speeds to 700 fpm.*



TACKY...

Camachine Model 26-61PL

For lightly tensioned rolls of adhesive coated materials and other papers, plastics, or textiles which tend towards excessive adhesion of plies in the finished rolls, especially after long storage. Trim widths to 62". Rewound rolls to 3" dia. Speeds to 250 fpm.*



To help select the right Camachine for economical production in your plant let us make a test run on your material producing rolls to your specifications. See your Cameron representative or write today.

**Speeds depend on characteristics of material, machine width, number of cuts and web tension.*

Don't wind up with less than a Camachine®

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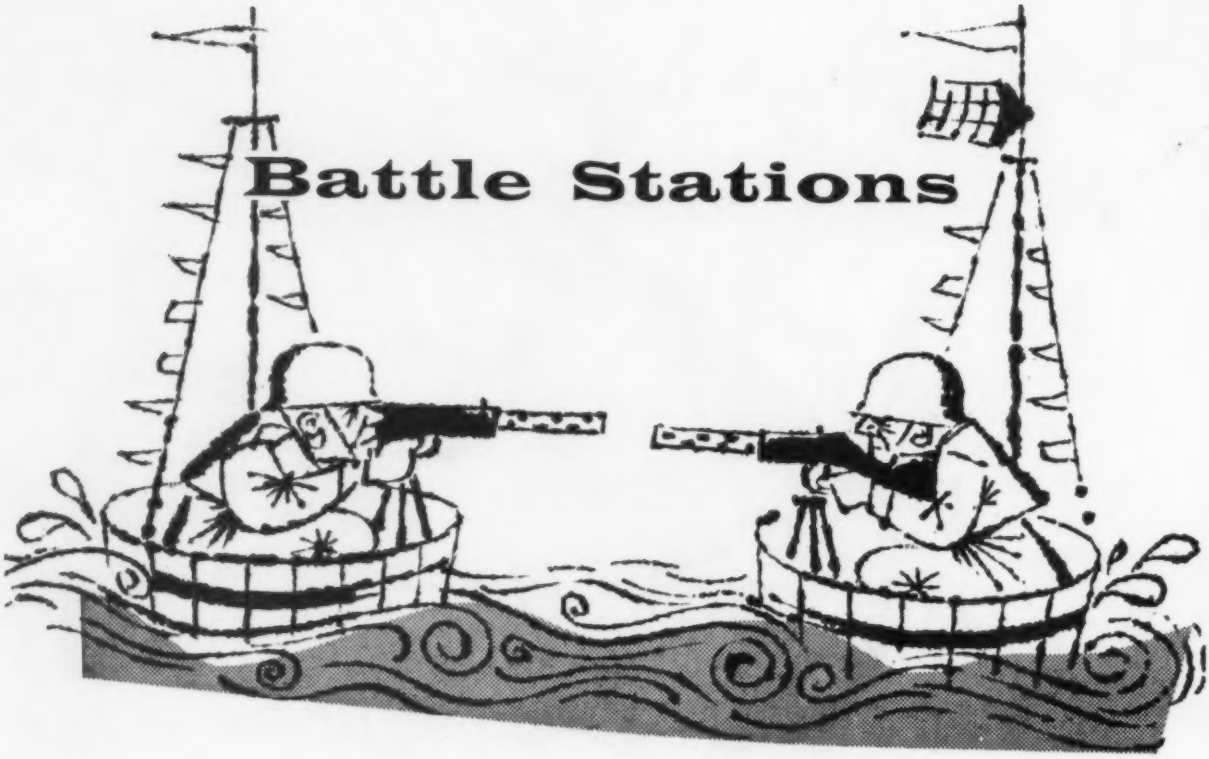


Is this the cry that goes up every time you and your molder get together? Do you battle with him about delivery or quality or extra costs? This sort of storm is just so much "bilge"—*you* are top man and your orders should be carried out with diligent attention.

There's never a need to "hit the riot button" when Admiral Boonton handles your custom injection and compression molding . . . doing business with us assures smooth sailing, unmarred by rough seas. Lend an ear to the scuttlebutt among old hands at using plastics and you'll hear many a good word—and nary a cuss word—about the prosperous voyages they've enjoyed under Boonton's flag.

Admiral Boonton's Order-of-the-Day always calls for top quality custom molding coupled with top quality service. Along with our first rank workmanship, we offer you many extra courtesies and services that will make our association mutually pleasing. We'll be glad to welcome you aboard.

You can watch your mold run at—

BOONTON MOLDING CO.

BOONTON, NEW JERSEY

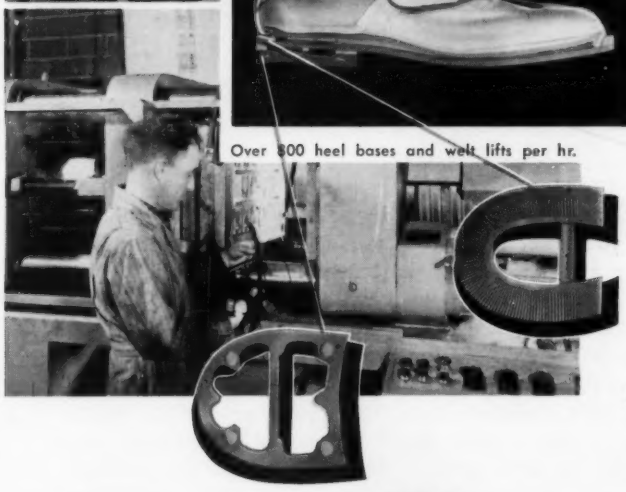
NEW YORK OFFICE—CHANIN BUILDING, 122 EAST 42ND STREET, OXFORD 7-0155

"Our H-P-Ms paid for themselves THE FIRST YEAR...

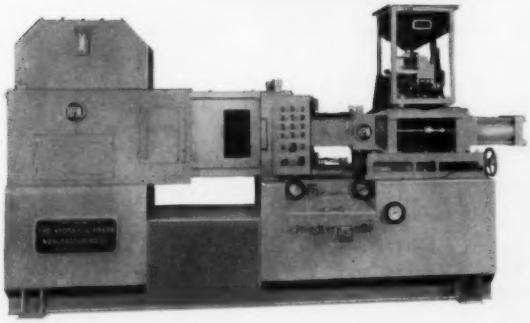
. . . and Weinbrenner Shoes are better than ever!"

Frederick A. Wilmanns Executive Vice President
Weinbrenner Shoe Co., Milwaukee, Wisconsin

Over 600 heel counters per hour



Over 800 heel bases and welt lifts per hr.



H-P-M Plastics injection molding machines and plastics are a proven production team specializing in making products better and saving money.

The Weinbrenner Shoe success story points out the important part plastics and H-P-Ms are playing in the shoe industry. Crush-proof, moisture-proof, rot-resistant polyethylene improves the quality of the shoe and high-speed, efficient H-P-M injection machines, molding heel counters, heel bases and welt lifts, effect big savings in production time. Production of heel counters averages better than 600 per hour and heel bases and welt lifts are running at over 800 per hour.

H-P-M now offers the world's most complete line of plastics injection machines . . . 6 to 400 ounce capacity . . . with mold clamping forces from 150 to 3000 tons. Automatic operation, subplate mounted valves, quiet pumps, full hydraulic clamp, high-speed injection and automatic weigh feed are just a few of many advanced features . . . for full details on the new H-P-M line, write for Bulletin #5406 today!

Write Today

☐ for details of New H-P-M line—ask for Bulletin #5406

☐ for your copy of "The Story of a Run-Down Heel and How it Put Plastics into the Shoe Business" . . . it's an interesting case study on Weinbrenner Shoe Co.

HPM

THE HYDRAULIC PRESS MFG. CO.

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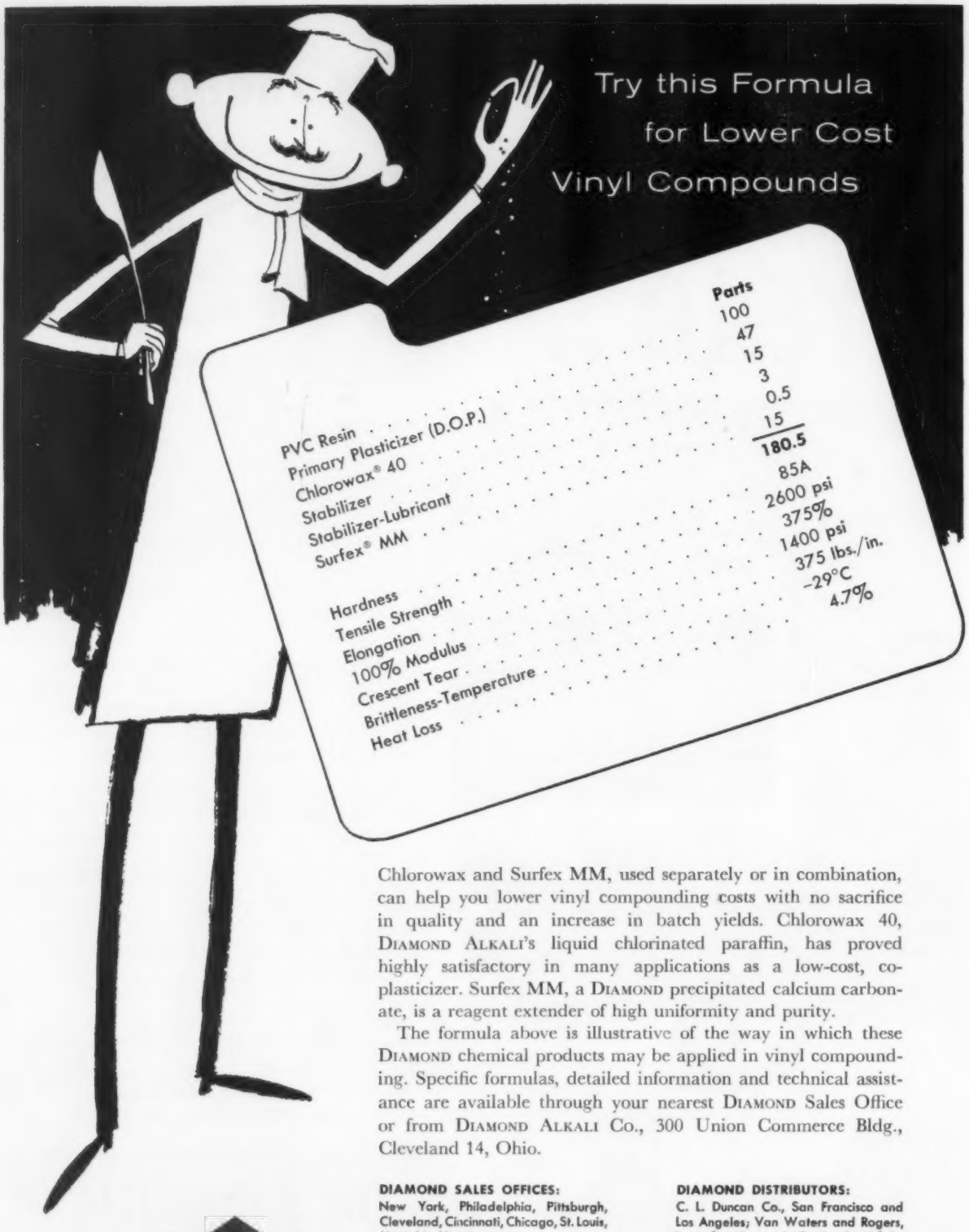

Chlorowax and Surfex MM, used separately or in combination, can help you lower vinyl compounding costs with no sacrifice in quality and an increase in batch yields. Chlorowax 40, DIAMOND ALKALI's liquid chlorinated paraffin, has proved highly satisfactory in many applications as a low-cost, co-plasticizer. Surfex MM, a DIAMOND precipitated calcium carbonate, is a reagent extender of high uniformity and purity.

The formula above is illustrative of the way in which these DIAMOND chemical products may be applied in vinyl compounding. Specific formulas, detailed information and technical assistance are available through your nearest DIAMOND Sales Office or from DIAMOND ALKALI Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

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DIAMOND ALKALI CHEMICALS ®

DIAMOND ALKALI COMPANY
CLEVELAND 14, OHIO

The Crow and the Pitcher

A Crow, ready to die with thirst, flew with joy to a pitcher which he beheld some distance away. But when he came up to it, he found the water so low that with all his stooping and straining he was unable to reach it. Thereupon he tried to overturn the pitcher, so that at least he might be able to get a little of it. But his strength was not sufficient for this. At last, seeing some pebbles near by, he cast them one by one into the pitcher; and thus, by degrees, raised the water up to the very brim and satisfied his thirst.—**Aesop**

PLENCO PHENOLICS

FOR BETTER PLASTIC PRODUCTS

PLASTICS ENGINEERING COMPANY
Sheboygan, Wisconsin

Skill and patience will prevail. Look to Plenco for the skill and patience it takes to produce quality controlled Phenolics suitable to almost any application.

for **TOUGH** molding jobs...

Photo courtesy Plastiline, Inc.

METASAP® STEARATES

deliver easier mold release

For molding those intricate shapes, for deep drawing, or for larger-than-average pieces, the tested way to easy ejection is to use the right Metasap Stearate in your molding compound.

There are two ways to use these Stearates. You can incorporate Metasap Zinc or Calcium Stearates into the molding compound itself, or simply dust them on the molding surface. Either way, you get improved lubrication at lower ejection pressures. You step up your output, get fewer rejects and better finished products. Your molds last longer too.

Metasap Technical Service is prepared to help you find the materials and mixing procedures best fitted to your production methods.

And to produce economical plastigels . . . Metasap offers a complete line of quality stearates, effective as thickening agents. Free testing samples of Magnesium, Barium, Calcium, or Aluminum Stearates are yours on request.

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the cleanest stearates made

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TOO SMALL

TOO LARGE . . . . .

TOO COMPLICATED

if it's Plastic . . .

It Can be Done-

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Commonwealth offers:

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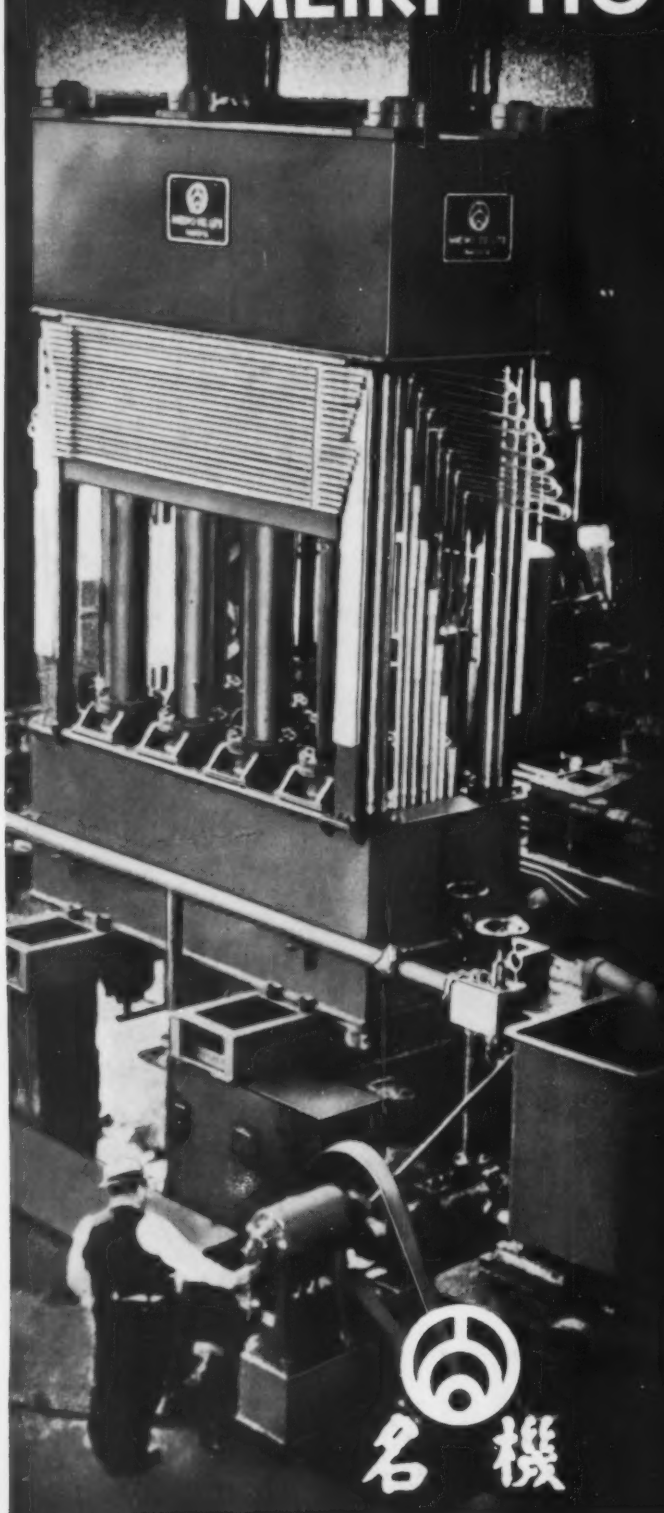

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- Plastics Sheeting
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- 1 to 25 Openings

Including Features of
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- Experience of Over 20 Years &
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HYDRAULIC DEPT.

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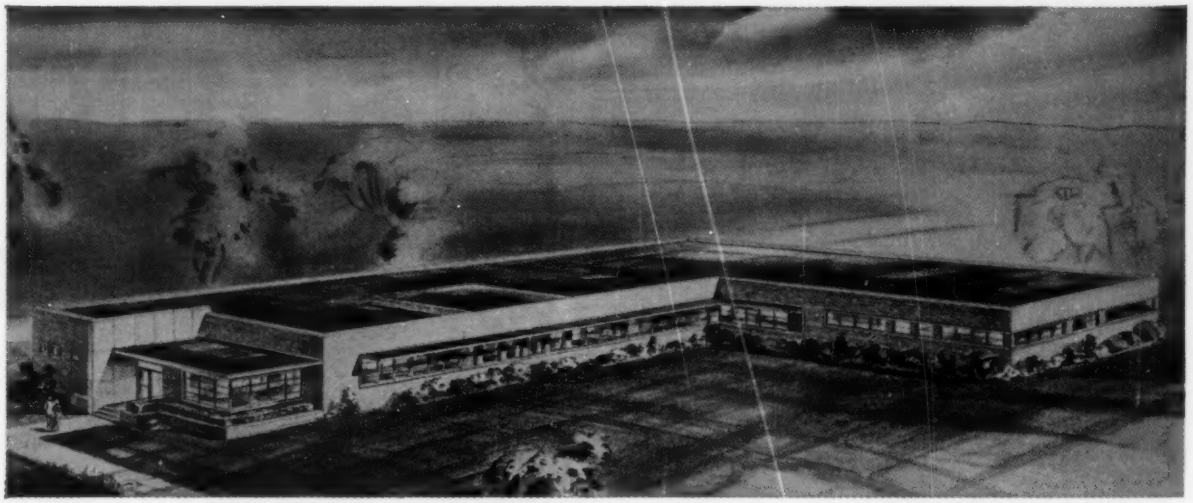
Why you should look to Petro for



Proposed laboratory facilities at Tuscola, Ill.

Polyethylene in 1955...RESEARCH

To help the polyethylene user with application and production problems, to maintain constant check on the quality of our polyethylene "Petrothene", and to keep pace with the latest improvements in product and processes, National Petro-Chemicals Corporation is expanding laboratory facilities at its Tuscola, Illinois plant site.

When Petro's polyethylene unit comes on stream in the Spring of 1955, the laboratory building will be twice its present size. It will be staffed with specialized research and development men, ready to serve you—the customer—from the standpoint of a constant supply of uniform quality product, and from the standpoint of aiding you in the solution of your production and application problems.

Close cooperation at the plant site among production, laboratory, and sales and service personnel will assure Petro customers of polyethylene exactly suited to their needs. If you plan to purchase polyethylene in 1955, consult with us now about long-term contract arrangements.

"PETROTHENE" — THE POLYETHYLENE FOR TOMORROW.

NATIONAL PETRO-CHEMICALS

CORPORATION

A joint enterprise of National Distillers Products Corporation and Panhandle Eastern Pipeline Company

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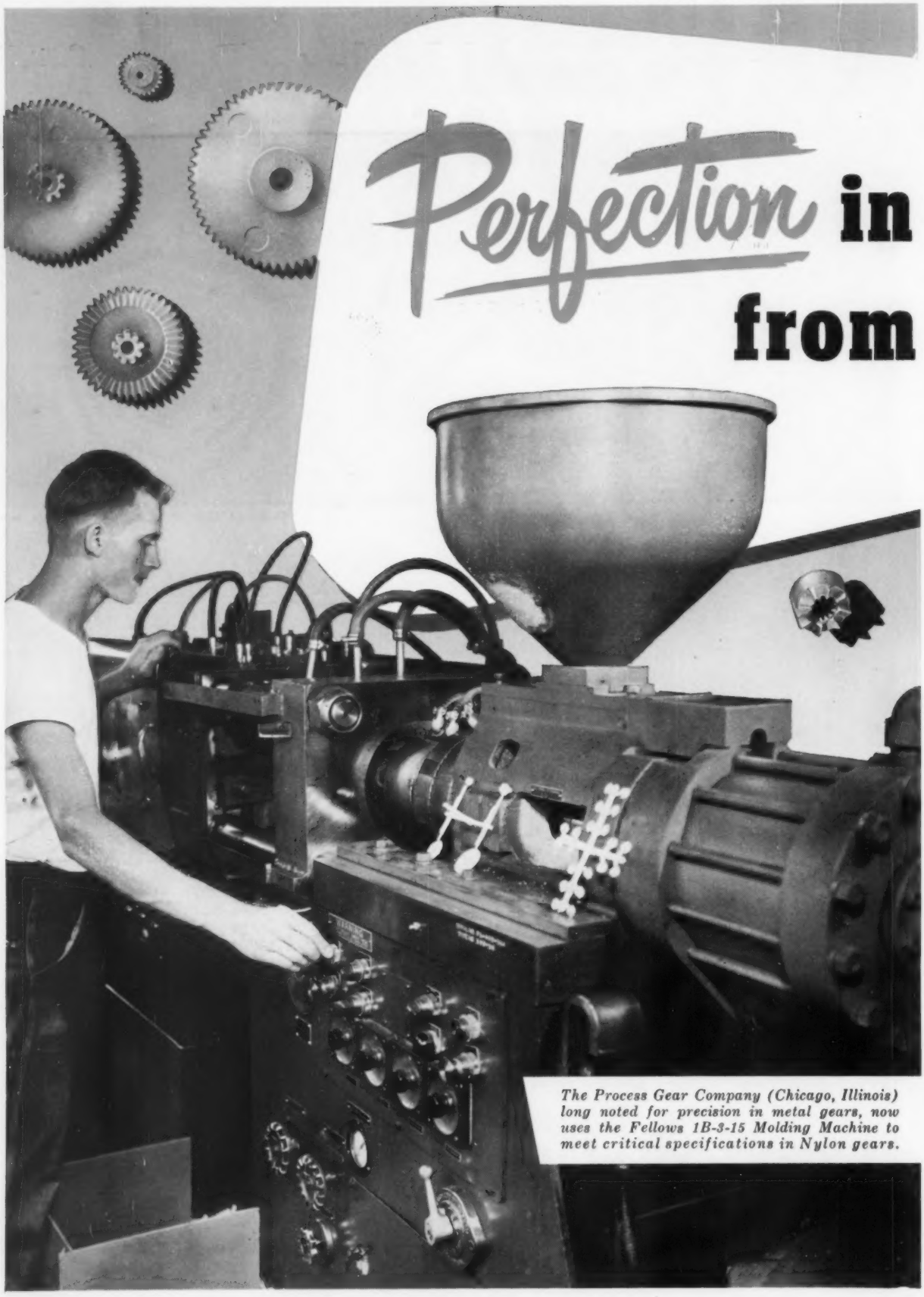
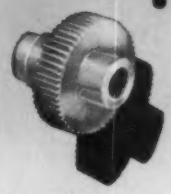


The Process Gear Company (Chicago, Illinois) long noted for precision in metal gears, now uses the Fellows 1B-3-15 Molding Machine to meet critical specifications in Nylon gears.

Nylon* Gears Every Shot!

...from a Fellows 1B-3-15 Molding Machine



Good news for every molder who wants to build quality business.

The same Fellows Molding Machines you use for styrene, polyethylene and so many other materials will produce high quality Nylon Moldings with efficiency and dependability.

With proportional temperature controllers and a Fellows temperature controlled Nylon nozzle, machines can be operated hour after hour without drool. Plasticizing rates are second to none on this normally derating material. Tolerances to thousandths of an inch at high production rates allow any molder to capitalize on Nylon properties and profits.

There is a Plastics Machine Specialist at each Fellows Sales Office, ready and able to plan with you on cutting your molding costs. Write, wire or telephone today.

*"ZYTEL" NYLON A DUPONT PRODUCT

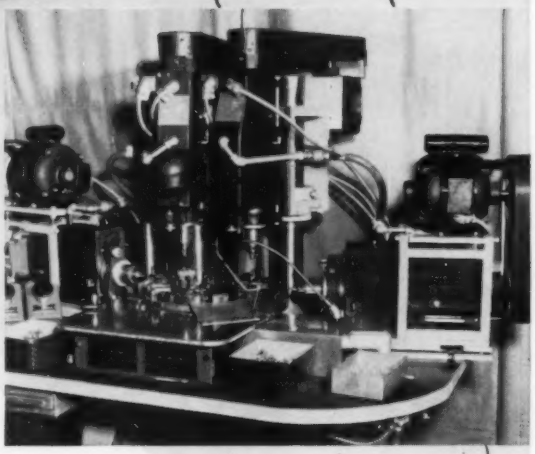
Fellows

injection molding equipment

THE FELLOWS GEAR SHAPER COMPANY, Plastics Machine Division, Head Office and Export Department, Springfield, Vermont
Branch Offices: 319 Fisher Bldg., Detroit 2, Michigan • 5835 West North Avenue, Chicago 39, Illinois • 2206 Empire State Bldg., New York 1, N.Y.

If time meant money he'd drill and tap with

Bellows-LOCKE DRILL UNITS



An extra second or so drilling a hole may not mean much to a woodpecker. But in today's cost picture it means dollars to you.

If you have any part in which you are drilling or tapping two or more holes in any size up to 1/4" or 5/16", The Bellows-Locke Drill Unit offers practical opportunities for substantial cost reduction.

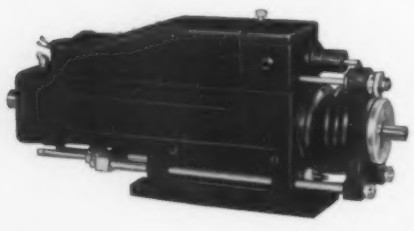
It is particularly effective as a basic component for toolroom-built special purpose drilling and tapping machines. It is compact, streamlined, relatively light in weight, can be installed in any angle in any plane. Any number of units can be easily synchronized and interlocked for accurately timed sequence operation.

The spindle is electrically driven (either pulley drive or direct motor drive). Rapid advance and retract is by pneumatic power. Feed rate is hydraulically controlled. All three circuits: electric, pneumatic and hydraulic are interlocked for simple, positive push-button control.

Major cost reductions are often the accumulated total of many minor savings. Look at your drilling and tapping costs with a critical eye.

WRITE FOR THIS BOOKLET—

Describes the Bellows-Locke Drill Unit in detail — shows how and where it can be used to best advantage. Free on request. Address: The Bellows Co., Dept. MP1154, Akron 9, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., 4972 Dundas St., W. Toronto, Ontario, Canada.



The Bellows Co.

AKRON, OHIO

911-A

High scoring hand—

MUEHLSTEIN PLASTICS

*MUEHLSTEIN VINYL

Whether you *calender* film, sheeting or flooring—*extrude* hose, tubing, spline, channel—*mold* toys or novelties—*coat* paper or fabrics, MUEHLSTEIN has a VINYL raw material for you. We convert your scrap into pellets, granules, slabs or *dollars.*

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***NOTE:** We offer top prices for distressed inventories of molded parts, purgings and all thermoplastic materials.*

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Vacuum-Formed

Blister-type package by
Vacu-Form Corp. of America,
Brooklyn, N. Y.

packages in Celanese* Acetate

the fastest growing idea since transparent films

Flexible design at low cost—in packaging hardware, jewelry, personal goods, toys and hundreds of other products.

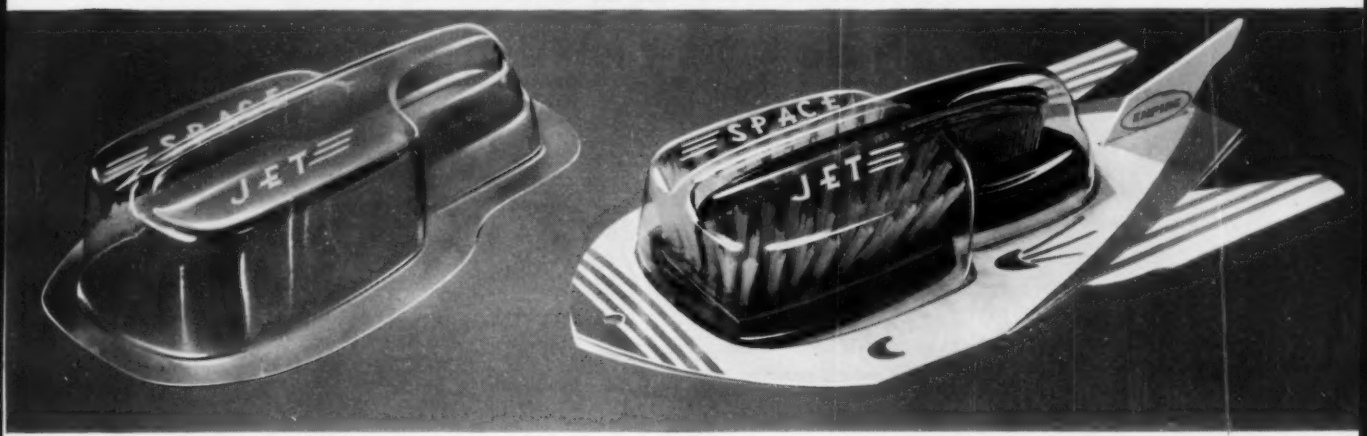
Two-part pill box for Schering, by
Plastic Artisans, Inc., White Plains, N. Y.

Capsule enclosure for Squibb Division, Olin Mathieson Chemical Corporation, by Mason-Keller Corporation, Roseland, N. J.

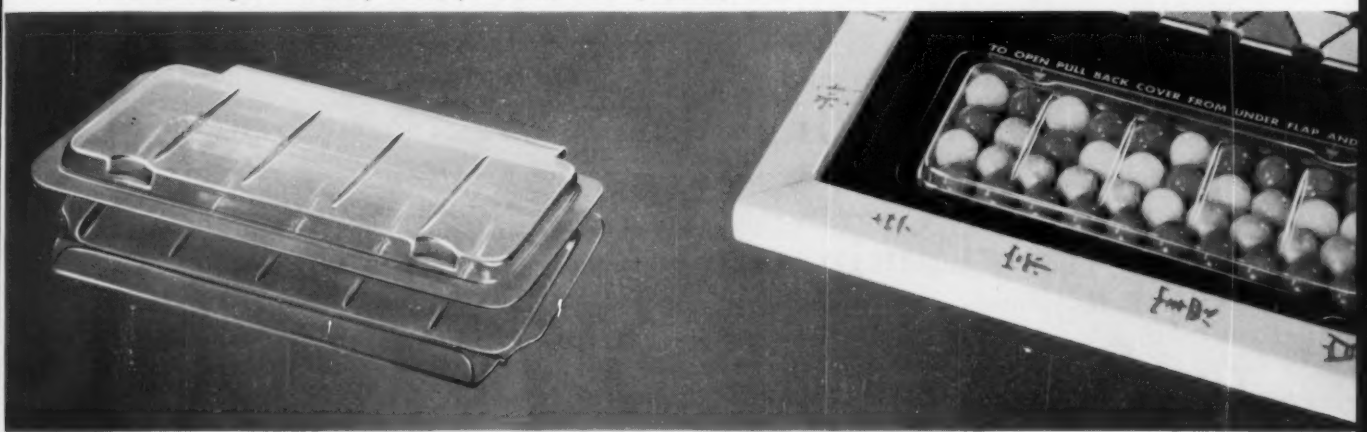
Sample enclosure for Coty, by
Ve-Alite Plastic Corp., Brooklyn, N. Y.

PARGRAN
Squibb Multiple Vitamin Capsules
This is the standard maintenance mixed vitamin formula recommended by the Committee on Therapeutic Nutrition, Food and Nutrition Board, National Research Council.
EACH CAPSULE CONTAINS:
Vitamin A (crystalline)
Vitamin D (irradiated ergosterol)
Menadione (vitamin K)
Ascorbic Acid
Calcium P...
Thi...

Two-part display container (17" x 10") for a variety of products. Developed by Plaxall, Inc., Long Island City, N. Y.



Product-conforming container for Empire Brush, by Shaw Randall Co. Inc., Pawtucket, R. I.



One-piece Chinese checker box incorporating spring hinge and clasp—by Western Coil & Electrical Co., Racine, Wisc.

Double your sale chances with packaging that dramatizes your product!

Vacuum-forming is a new packaging method that is built for short and long runs. Using Celanese transparent acetate sheet, the vacuum-formed package gives your product the visibility it needs in today's competitive market. It makes necessities look like luxuries, and a fair price look like a bargain.

Celanese Product Development Staff can tell you more about the possibilities of this fastest growing packaging idea . . . estimate probable cost, and put you in touch with fabricators who specialize in vacuum-formed merchandise. Write or call Celanese Corporation of America, Plastics Division, Dept. 101-K, 290 Ferry Street, Newark 5, N. J. Canadian affiliate, Canadian Chemical Company Ltd., Montreal and Toronto.

Celanese* PLASTICS

*Reg. U. S. Pat. Off.

Boil proof — low breakage rate
Domestic Mouldings

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Textile Finishes

Fire resistant — dimensionally stable
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Maximum wet strength
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High arc and track resistant
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THE BRITISH OXYGEN CO LTD

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AFRICA THE AFRICAN OXYGEN & ACETYLENE (PTY.) LIMITED, Afrox House, Corner Booysens Road, & Webber Street, P.O. Box 5404, Johannesburg.

AUSTRALIA THE COMMONWEALTH INDUSTRIAL GASES LIMITED, 138 Bourke Road, Alexandria, P.O. Box 55, Sydney.

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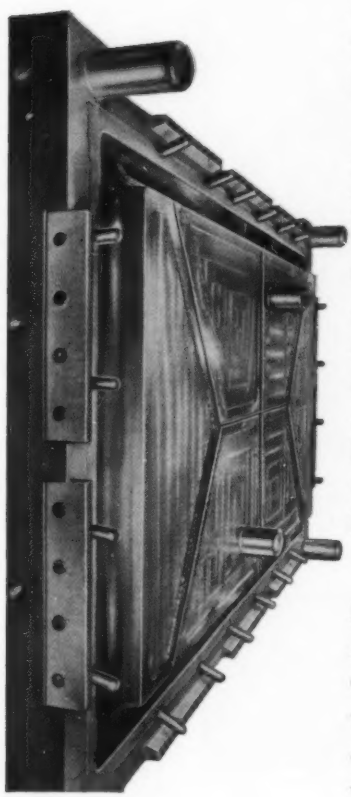
here's why

CRUCIBLE MOLD STEEL ***was chosen for largest injection mold...***

Crucible CSM 2 mold steel was the choice for this injection mold — the largest yet produced. From it, the Cambridge-Panelyte Molded Plastics Company, a subsidiary of St. Regis Paper Company, turns out trim frames for Carrier home freezers. The mold itself was made by Eagle Tool and Machine Company.



There are good reasons why leading manufacturers specify Crucible. First of all, Crucible mold steels are actually tool steels, made by the electric-furnace process to tool steel standards . . . in the country's leading tool steel mill. It's this painstaking care that pays off in uniform, high-quality steels.

It will pay you to specify Crucible mold steel for your next job. Crucible engineers are available to work right with you on the selection or fabrication of mold steels . . . and when you choose the correct grade you can get it *fast* from your local Crucible warehouse.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **MOLD STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.

No limit on new ideas...product improvements... with NEW DU PONT MYLAR

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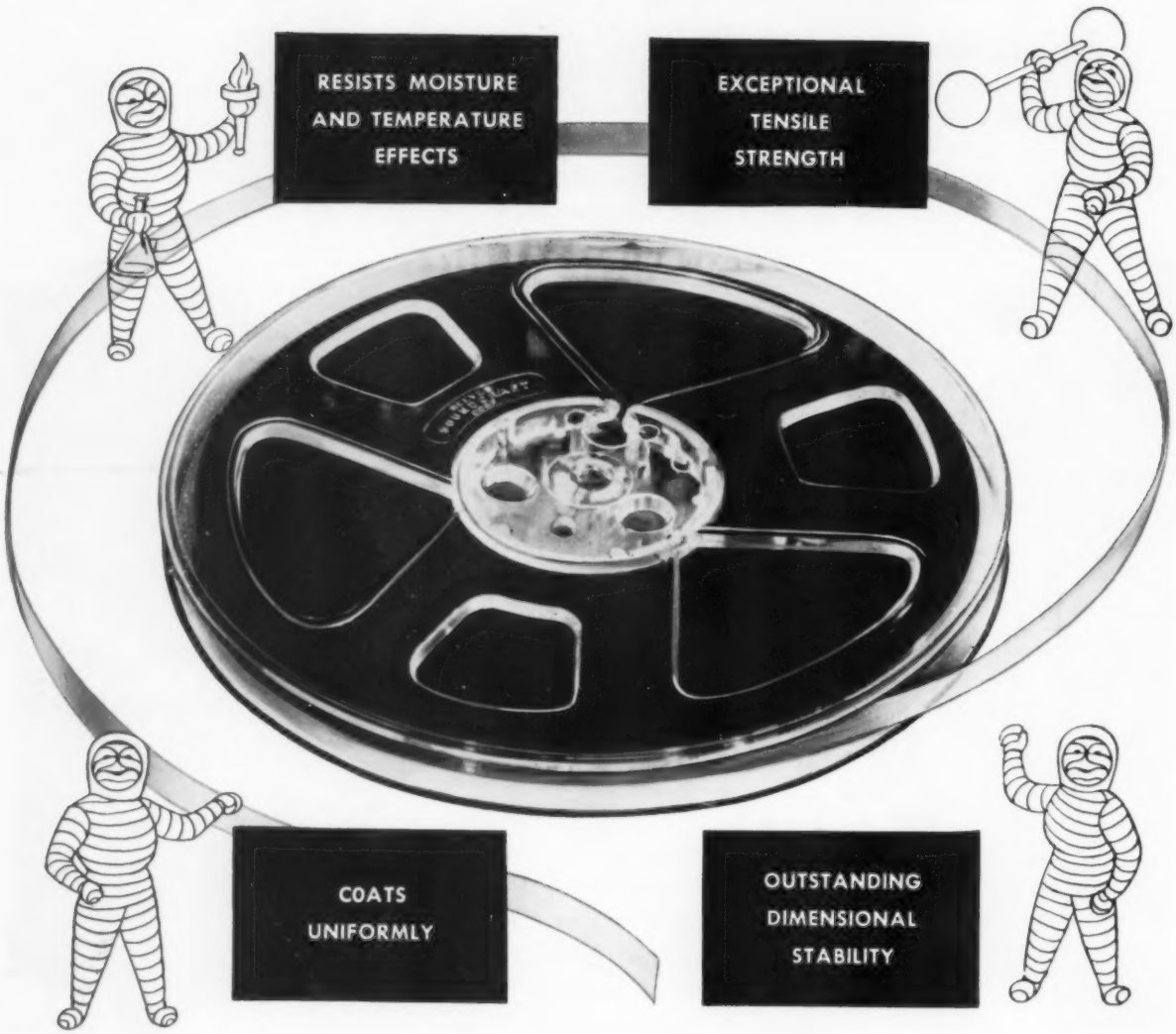
ONE EXAMPLE: MAGNETIC RECORDING TAPE



New Du Pont "Mylar"—strongest of all plastic films—offers a unique combination of physical, electrical, chemical and thermal properties . . . opens new possibilities for product improvement in a variety of fields.

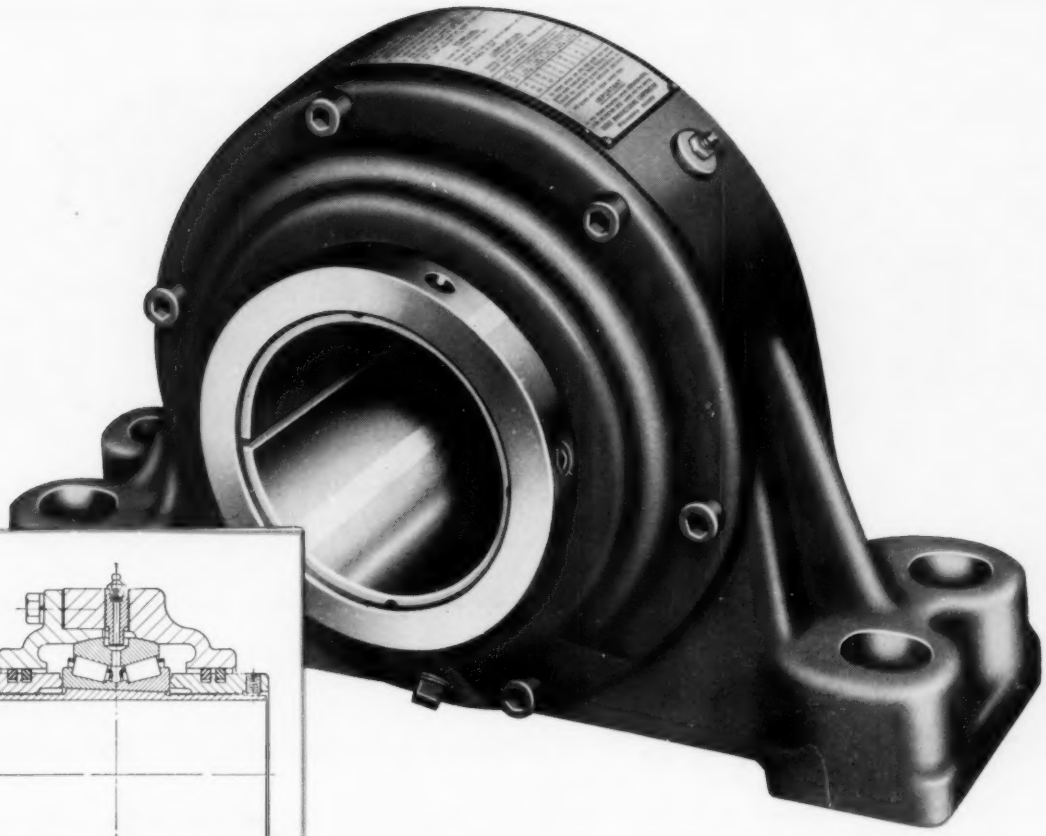
One example of increased product performance brought about by the use of this versatile film is the magnetic recording tape shown above. The high tensile strength of "Mylar" permits thinner and stronger tapes. Exceptionally resistant to moisture and temperature extremes, the tape is longer-lasting . . . easier to store.

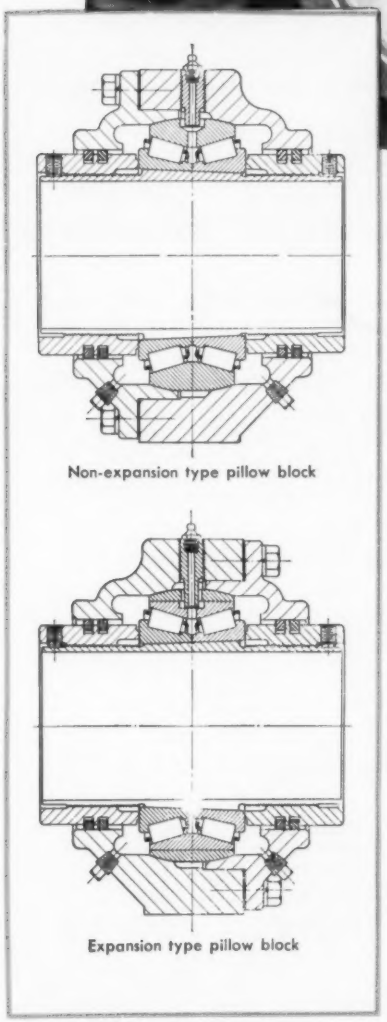
"Mylar" polyester film is also being used to make better motors, transformers, capacitors, and other electrical equipment. It is used as a protective film for thermal insulation, an easily cleaned covering for acoustical tile, a liner for caps and drums. When metalized, "Mylar" becomes an abrasion- and tarnish-resistant material ideal for decorative purposes.

Evaluate the possibilities of "Mylar" for improving your own products; send for your copy of a free booklet showing where this new film's properties can be used to advantage. Write to: E. I. du Pont de Nemours & Co. (Inc.), Film Department, Room 4M, Wilmington 98, Del.

DU PONT ® MYLAR POLYESTER FILM

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY





Non-expansion type pillow block

Expansion type pillow block

How the new Dodge-Timken All-Steel pillow block gives you more load capacity in less space

HERE'S the new "All-Steel" pillow block that's making an outstanding record in heavy-duty applications. It takes up less space. It weighs less. Yet this Dodge-Timken All-Steel pillow block has tremendous load-carrying capacity. It is available in both expansion and non-expansion design. And it incorporates all the advantages of Timken® tapered roller bearings.

Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. Line contact between rollers and races gives Timken bearings greater load-carrying capacity. And the Timken bearing in this pillow block is of new design, with tapered bore and self-aligning spherical outer race.

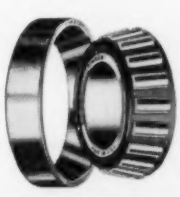
Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel—and under normal conditions will last the life of the machinery with which the pillow block is used.

Timken bearings make any machine better. Always look for the trade-mark "Timken" on the bearings in the machines you buy or build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

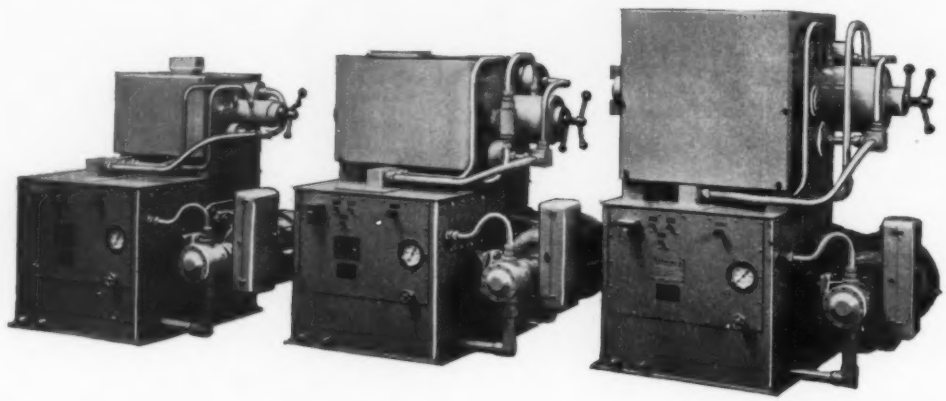
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◯ AND THRUST ←◯→ LOADS OR ANY COMBINATION ←✳→



Clean-up is minimum because there is no powder spillage —filling takes place *within* the hopper

Patents applied for

You cannot damage a Bipel pelleter. These horizontal hydraulic pelleters have eliminated expensive smash-ups.

Since the Bipel pelleter cannot exceed the set pressure, even if double loading takes place, no machine damage can occur.

Compression molders who have long sought the advantages of *hydraulic* preforming combined with the rapidity of mechanical preforming and with minimum need for maintenance will find what they have been looking for in Bipel Horizontal Hydraulic Pelleters. These machines simplify the job of making sound preforms at high speeds.

Bipel Pelleters use the main ram for compressing the powder only; filling and ejecting depend on rapid movements of the die and hopper. Thus, the powder is compressed not by a blow as in mechanical preforming, but by a *steady squeeze* that can be applied long as needed to compact the powder. The dwell and the pressure can be accurately set for any particular powder in a matter of a few seconds. Even difficult powders can usually be preformed successfully.

Moreover, no moving parts come between the punches, so the machine cannot suffer damage. The die is completely free during the squeeze, which is equivalent to applying pressure on both punches. As a result pellet density is always uniform, even when square, rectangular or ring-shaped punches are used.

Bipel Hydraulic Pelleters are completely self-contained with their own motors and pumps (shop air supply is used for the controls). Since pressure builds up only during squeeze and ejection, the motors idle most of the time. Power consumption is small.

Send for descriptive folder

maximum pressure	12 tons	35 tons	70 tons
maximum strokes per hour	2280	1260	720
typical pellet weight*	.2—1.2 oz. (1½" dia.)	3.7—8.1 oz. (3" dia.)	8.3—18 oz. (4½" dia.)

*based on average powder density of .35 ozs. per cubic inch

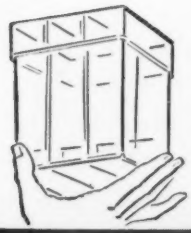
Complete information on these pelleters and on Bipel "auto control" presses can be obtained in the United States from:

Ralph B. Symons Associates, Inc.
3571 Main Road
Tiverton, Rhode Island

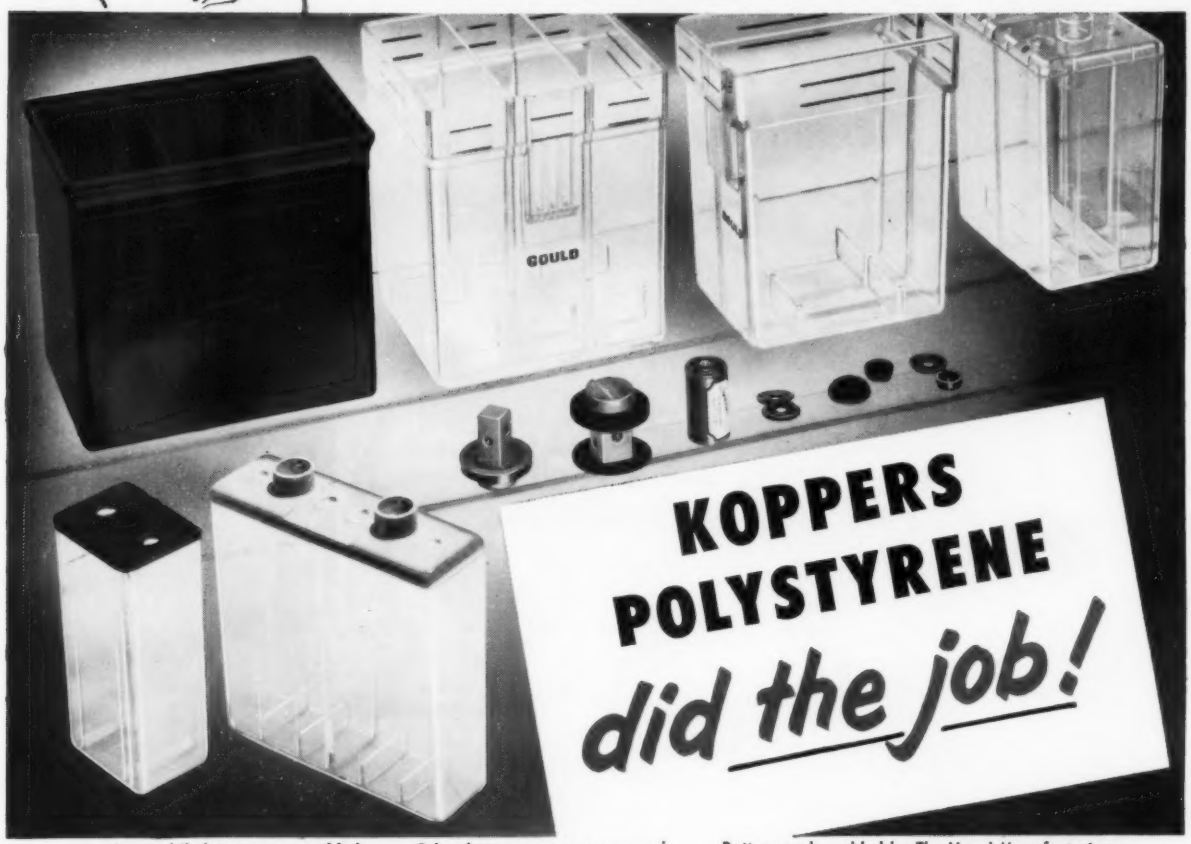
B·I·P GROUP

B.I.P. ENGINEERING LTD.

Aldridge Road, Streetly, Staffordshire, England



They needed a plastic to make tough, lightweight battery cases . . .



Automobile battery case molded by General American Transportation Co., Chicago, Ill.

Other battery cases, covers and post seal nuts molded by Nosco Plastics, Inc., Erie, Pa.

Battery seals molded by The Vogel Manufacturing Co., Bridgeport, Conn. for Winchester Repeating Arms Co., Division of Olin Mathieson Chemical Corp.

KOPPERS POLYSTYRENES

"Fibertuff"	Glass fiber reinforced polystyrene
Type 3	General Purpose Polystyrene
Type 7	Improved Heat Distortion Temperature
Type 8	Highest Heat Distortion Temperature
MC-185	"High Impact," Lowest Water Absorption Rate
MC-305	"High Impact," Easy Flow
MC-309	"High Impact," Highest Heat Distortion
MC-405	"Medium Impact," Easy Flow
MC-409	"Medium Impact," Highest Heat Distortion Temperature

• If you've ever lifted a conventional storage battery, you know that they're heavy and hard to handle. This has always been a headache for repair men and motorists alike. To remedy this situation manufacturers of stationary and auto batteries have been looking for plastic cases, covers and vent plugs that would weigh less than the old hard rubber parts, yet remain strong and durable.

Battery manufacturers found what they needed in the family of Koppers Polystyrenes. For stationary batteries of the type used in telephone installations, they chose Koppers Polystyrene 81, a durable lightweight plastic. For auto batteries they chose Koppers Modified Polystyrene MC-409, because it combines high impact resistance with light weight. Another Koppers Polystyrene, Type 185, was used for caps on dry cell flashlight type batteries because of its high impact strength.

Koppers Polystyrenes are successfully serving in hundreds of applications besides battery parts. Perhaps you can improve your product or lower production costs by using one of these versatile formulations. For complete information, write to Koppers Company, Inc., Chemical Division, Pittsburgh 19, Pennsylvania.

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KOPPERS

Koppers Plastics

Koppers Plastics Make Many Products Better and Many Better Products Possible.

KOPPERS COMPANY, INC., Chemical Division, Dept. MP-114, Pittsburgh 19, Pennsylvania

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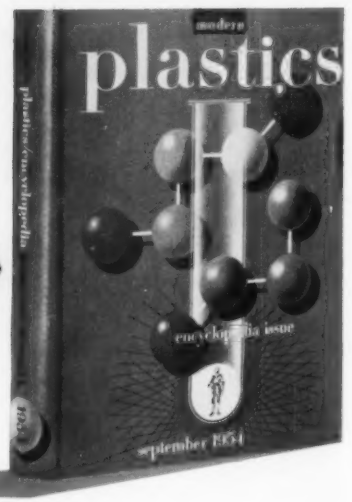
A high proportion of your routine questions about plastics and plastics processing, plus lots of other questions which are genuine "puzzlers," can be answered by referring to your copy of the 1954 MODERN PLASTICS ENCYCLOPEDIA issue.

SHORT CUT



to plastics information

Here, readily accessible, arranged for quick reference, you will find *basic* as well as *specialized* plastics information. It contains data on the chemical and physical properties of the different plastics resins . . . on processing film and sheeting . . . on decorating plastics . . . on laminating . . . on mold design for various types of molding . . . on machinery and equipment . . . on literally *thousands* of additional subjects.

Get acquainted with the MODERN PLASTICS ENCYCLOPEDIA issue right away. Refer to the many fact-filled ads. Explore the extensive Directory Section which lists suppliers of materials, equipment and services. Use it often. Doing so will be to your advantage.

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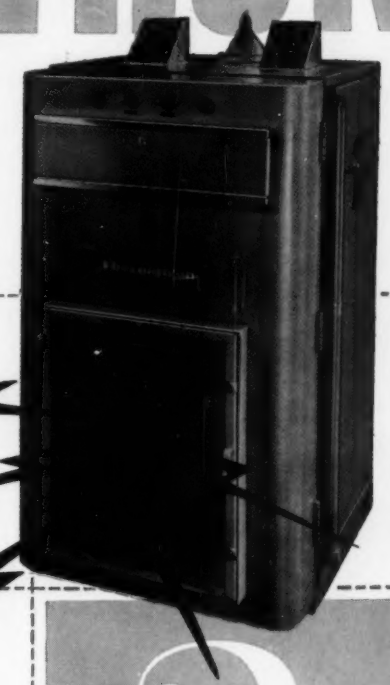
THERMATRON

HIGH FREQUENCY SEALING AND HEATING EQUIPMENT

reaching out to more and more industries...*Let it give your production a helping hand!*



plastic sealing	glue drying
reinforced fibre glass curing and assembly	plastisol curing
	your new application ?

THERMATRON high frequency started with the sealing of belts, bags and other small items... moved on to larger products such as wading pools and outerwear . . . and now reaches out to embrace *all* phases of plastic production! Latest developments include the curing of plastisols and reinforced fibre glass.

THERMATRON can give your production a helping hand too! If you're in any phase of plastic fabrication, low cost, high speed THERMATRON electronic equipment can *heat, cure, dry* or *weld* faster and cheaper than any other method.

THERMATRON is so versatile it's hard to pinpoint every use. Some applications seemed impossible until our engineers went to work on them. The best way to find out how high frequency fits into *your* production is to let us run tests on your own material and offer sound recommendations . . . all without obligation, of course. Write today for bulletin no. 89.

Thermatron Division

RADIO RECEPTOR COMPANY, INC.

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SALES OFFICES: 251 West 19th St., New York 11, N.Y. WAtkins 4-3633
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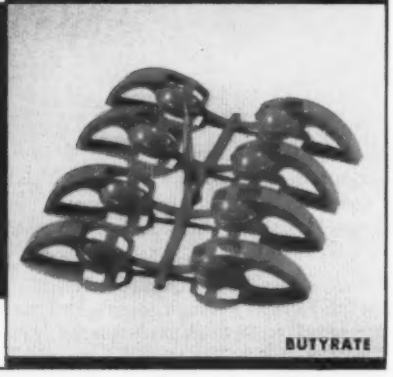
Los Angeles: Electroseal Plastics Co., 130 North Juanita Ave.
Factories in Brooklyn, N.Y.

Here's what FEDERAL TOOL learned about LESTERS



It takes some doing, to arouse enthusiasm over a new molding machine in an old and experienced molding shop. But that's exactly what happened at Federal Tool Corp. in Chicago when their new Lesters went to work.

No wonder, when in several cases production was actually doubled! Oversize shots and oversize areas have been handled with ease. They even reduced part weights through the rigid Lester locking assembly.

As Mr. Ray Olson, plant manager says, "We were frankly surprised by the performance of the Lesters. We knew we were buying good machines, but we never expected such a wide margin of difference."

Write for complete specifications on the machine suited to your molding requirements and ask to receive the Lester-Phoenix house organ, "The Lester Press."

LESTER INJECTION MOLDING MACHINES

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New York	Steven F. Krould
Detroit	Thoreson-McCosh
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Coral Gables	Morton Machinery Sales
Seattle	Perine Machinery & Supply Co., Inc.
Cincinnati	Index Machinery Corp.
Los Angeles	Seaboard Machinery Co.
San Francisco	J. Fraser Rae
St. Louis, Milwaukee	A. B. Geers
Providence	Sydney W. Lohman

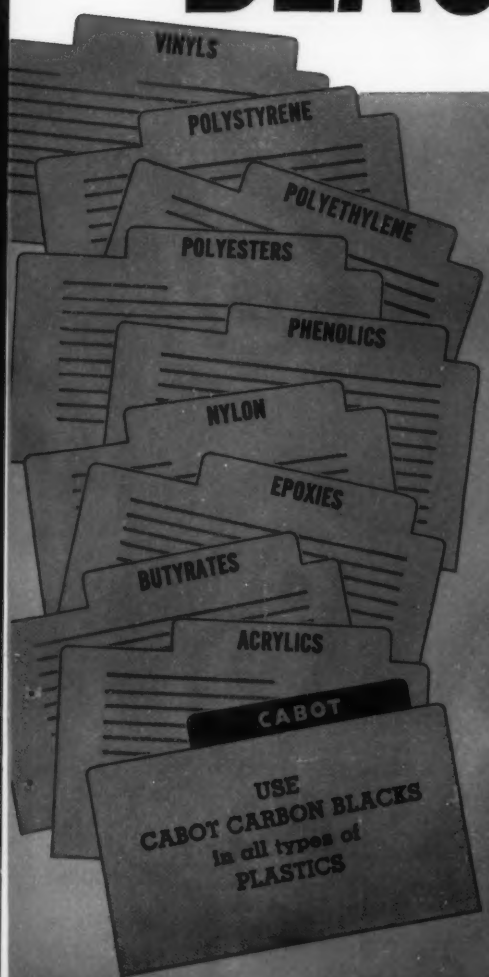
FOREIGN

Toronto, Canada	Modern Tool Works, Ltd.
Sydney, Australia	Scott & Holladay, Ltd.
Japan	Okura & Co., New York, Inc.
Stockholm, Sweden	Aktiebolaget Servus
Basle, Switzerland	Hermann Walti

distributed by LESTER-PHOENIX, INC., 2621-F CHURCH AVENUE • CLEVELAND 13, OHIO

For maximum jetness
and protection against weathering at low cost
in all types of plastics -
USE CABOT CARBON BLACKS

MONARCH® 74
BLACK PEARLS® 74*



MONARCH® 74 is used extensively where quality jetness and good dispersion are desired at low cost. In addition, it offers excellent protection against weathering and ultra-violet degradation.

MONARCH® 74 is the standard black of the industry for use in polyethylene.

To meet your other requirements —

MONARCH® 71
BLACK PEARLS® 71 * *Recommended where increased blackness is required. Available at slightly higher cost than Monarch® 74*

SUPERCARBOVAR® *Offers the maximum blackness obtainable, for polyvinyl chlorides and similar type materials.*

CARBOLAC® 2 *Provides maximum jetness in polyethylene and nitrocellulose systems.*

* PELLETED FORM

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Small...
Intricate...
BRIDGEPORT HAS THE COMPLETE FACILITIES TO MEET YOUR PLASTIC MOLDING NEEDS
Bridgeport offers complete modern Engineering and Mold Construction facilities to produce precision moldings in all Thermoplastic and Thermosetting materials — Phenolics, Urea, Melamine, Polystyrene, Polyethylene, Lucite, Plexiglas, Acetate, Butyrate, Nylon, and many others.
Bridgeport molds Products in a wide variety of sizes and forms ranging from tiny instrument parts to large refrigerator door panels. These products are molded by Injection, Compression, Plunger, and Automatic processes on equipment up to 200 ounce Injection and 452 ton Hydraulic Compression Presses.
We welcome the challenge of new products and problems. Write for complete details.
BPM
BRIDGEPORT MOULDED PRODUCTS INC., Bridgeport 5, Conn.

So strong it's guaranteed 3 years

...Modern's new LIFETYME

diving board made with

POLYLITE

Polyester Resins

Even the familiar diving board is acquiring new attributes through that versatile new basic material for industry, reinforced POLYLITE.

Modern Swimming Pool Co. is building diving boards to last for years . . . using POLYLITE to laminate fibrous glass to a perfectly proportioned core of Douglas Fir.

The LIFETYME board has many other advantages besides sturdiness. It is flexible . . . waterproof . . . and resists the action of chemically-treated water. It is money-saving. Wear is longer, so fewer boards are needed. Maintenance is nil. Extra "rotation" boards are eliminated, as there is no water-soaking to necessitate inactive drying periods. And to beautify any pool, permanent chip-and-peel-proof color is available as an integral part of the plastic.

For full facts that may point to POLYLITE for your product, write Reichhold for POLYLITE Brochure PR. For information on LIFETYME diving boards, address Modern Swimming Pool Co., Inc., 1 Holland Ave., White Plains, N. Y.

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everything vinyl does...

it does beautifully with

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This is beauty with a practical side. Hundreds of durable vinyl products, including upholstery materials, drapes, and shower curtains look their best when properly pigmented. And the best beauty treatment for vinyl is TITANOX white titanium dioxide pigments.

In vinyl, TITANOX rutile and anatase titanium dioxides impart exceptional whiteness, brightness and opacity, and their compatibility with all types of natural and synthetic polymers helps maintain natural strength. These modern pigments maintain bright, clean tints and their fine, uniform particle size means easy grinding and mixing for complete dispersion throughout the polymer.

Consult with our Technical Service Department for assistance with your problems in pigmenting natural or synthetic polymers. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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FOREMOST

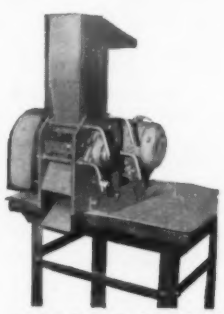
Beside-the-press PLASTIC SCRAP GRINDERS

Three field-tested models for 2 oz. to 200 oz. injection presses ...guaranteed to grind vinyl and polyethylene *without fluffing!*

Foremost Plastic Scrap Grinders are outstanding in every way. They employ a unique double-shear knife arrangement which permits grinding of injection molding scrap into neat granules...without fluffing. They are highly economical to maintain and low in initial unit cost. To see how a Foremost unit will work in your plant, see offer below.

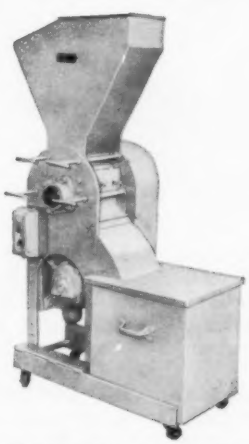
10 specific design features of FOREMOST

- no fly-back of material from hopper, no leakage anywhere.
- quickest and easiest to clean, low in maintenance cost.
- no wrenches required to remove hopper or screen.
- no jamming when fed hot sprues with hardened material.
- Special arrangement for feeding extra long sprues.
- convenient material bin supplied with cutter.
- unique double shear knives cut soft plastics easily.
- all steel construction.
- no exposed moving parts.
- batch grinds without any overheating.



MODEL 1A (½ HP)

Bench model recommended for laboratory use, or beside small injection presses. Available with or without material bin. Single phase, 110/220 volts. THROAT SIZE 3½" x 5".



MODEL 2A (1½ HP)

Floor model with casters. 250 units now in service throughout the U.S. Capacity ¼" screen — polystyrene material —150 lbs. per hour. THROAT SIZE 4" x 8".

MODEL 3C (3 HP)

Floor model with casters. Excellent for heavy sprues or parts such as brush-backs. Recommended for beside large presses; can be used for batch grinding up to 300 lbs. per hour. THROAT SIZE 6" x 12".

FREE 10-DAY TRIAL OFFER. Test Foremost in your plant by placing 10 day trial order. Foremost Machine Builders, Inc., 52 Vanderbilt Ave., New York 17, N. Y.

The Rainville Company

National Sales Agents

53 Hilton Avenue, Garden City, N. Y. • Pioneer 6-7135
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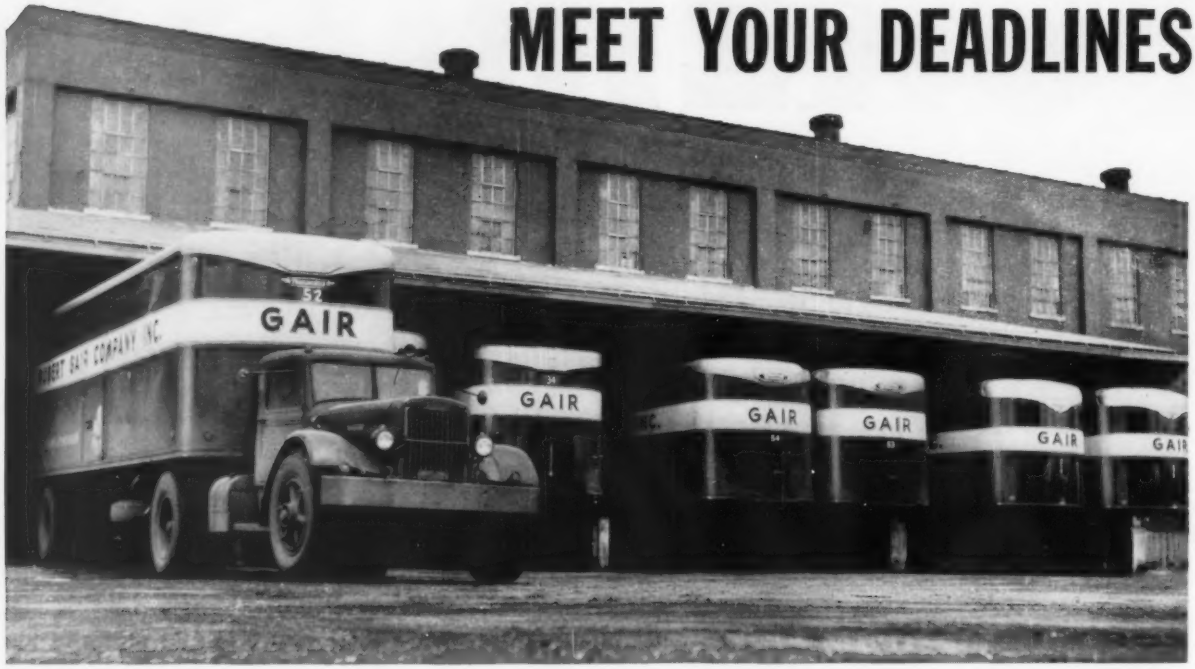
GAIR can help MEET YOUR DEADLINES



with assured delivery service

It's not hard to get a promise of shipping container delivery. But often there are a number of "ifs" in that promise. "Ifs" that don't exist at Gair.

"If our supply of raw materials permits, we'll be able to deliver on schedule" is one of the "ifs" you won't find at Gair. Our raw materials are grown in our own forests, processed in our own plants. We don't run short.

"If our manufacturing schedule holds up" is another qualification you won't hear from Gair. We have *eleven plants*, equipped to fabricate whatever quantities and types of corrugated or solid fibre shipping containers you need:

"If local transportation facilities stay on schedule" is a third worry you don't have with Gair. Gair trucks provide a neighborhood service from strategically located plants.

Check your nearest Gair plant for the complete story on Gair-designed shipping containers to meet your specific needs. SC.4.2

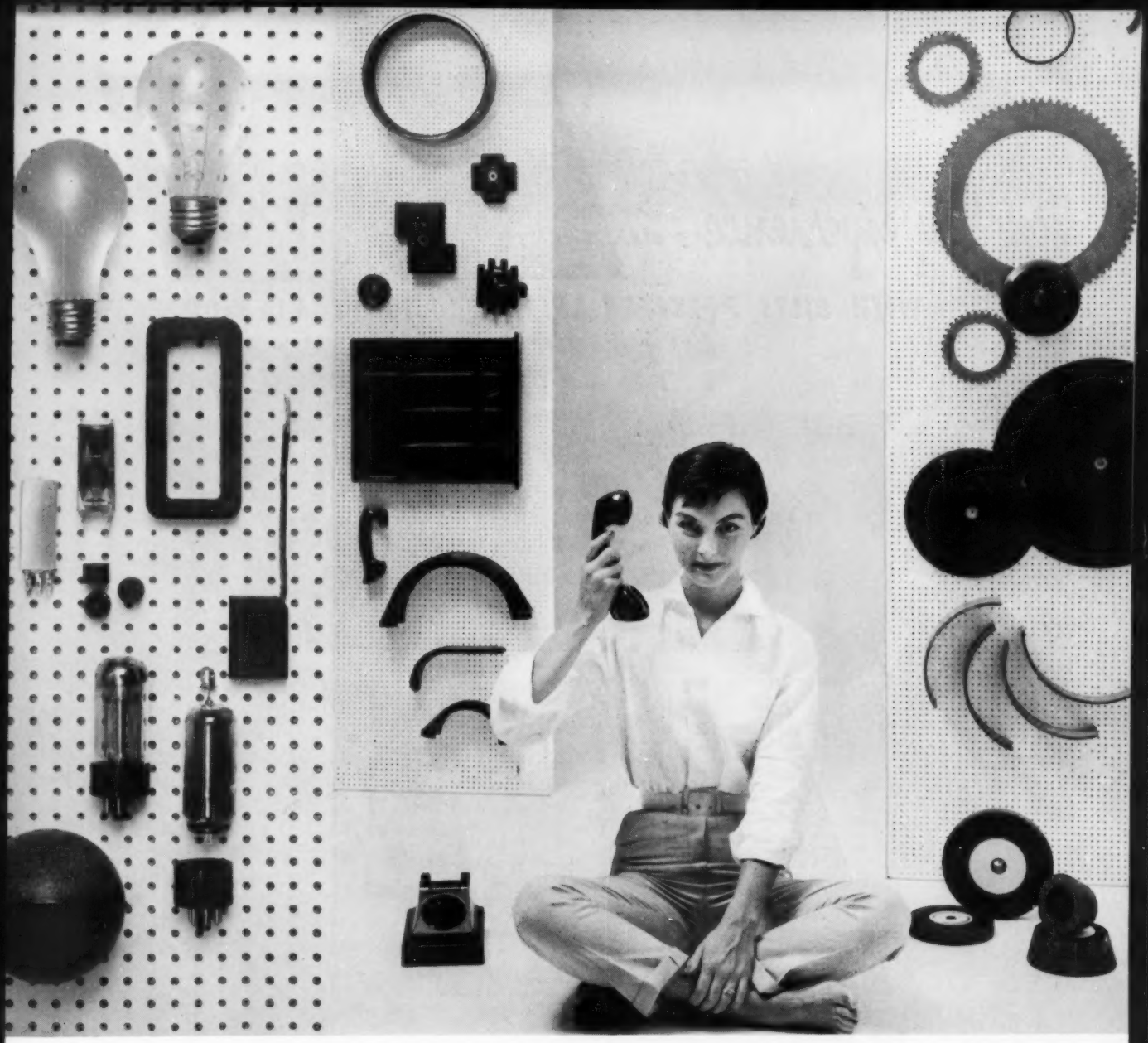
GAIR CONTAINER PLANTS

Cambridge, Mass. • Cleveland, Ohio • Holyoke, Mass. • Los Angeles, Cal. • Martinsville, Va. • No. Tonawanda, N.Y. • Philadelphia, Pa. • Portland, Conn. • Richmond, Va. • Syracuse, N.Y. • Teterboro, N.J.

GAIR

SHIPPING CONTAINERS
FOLDING CARTONS
PAPERBOARD

ROBERT GAIR COMPANY, INC. • 155 EAST 44TH STREET • NEW YORK 17



Call Borden for all phenolics

It took more than 25 years of continuous research to assemble all the phenolic resin applications in the picture above. That's how long Borden's DURITE division has been working with this versatile material. Today, DURITE offers you a wide variety of molding compounds including general purpose, closure, heat-resistant, electrical grade, impact-resistant and special purpose. Of particular interest is GP-102, the new fast-curing general purpose compound that increases production up to 25%.

DURITE also has a complete range of phenolic resins for other applications. There are abrasive bonding resins for grinding and cutting wheels and coated abrasives, frictional bonding resins for brake linings and clutch facings, wood waste resins for molded sawdust products and hard boards, cold molding resins ideal for this low-cost process, casting resins for tool and die work, lamp basing cements and special property resins. If you have a phenolic problem, a DURITE technical representative would be glad to assist you. Call or write today to the Borden Company, Chemical Division, DURITE Products Dept. MP-114, 5000 Summerdale Ave., Phila. 24, Pa.

DURITE

THE *Borden* COMPANY

CHEMICAL DIVISION

PHENOLIC MOLDING COMPOUNDS • ABRASIVE AND FRICTIONAL BONDING RESINS • MOLDING AND SPECIALTY RESINS • LAMP BASING CEMENTS

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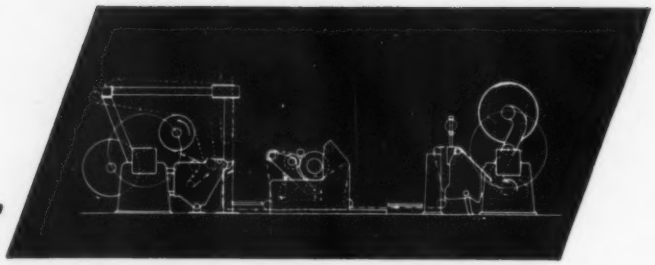
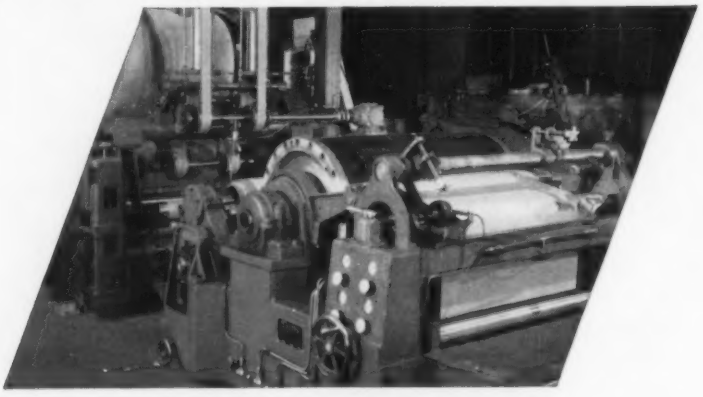
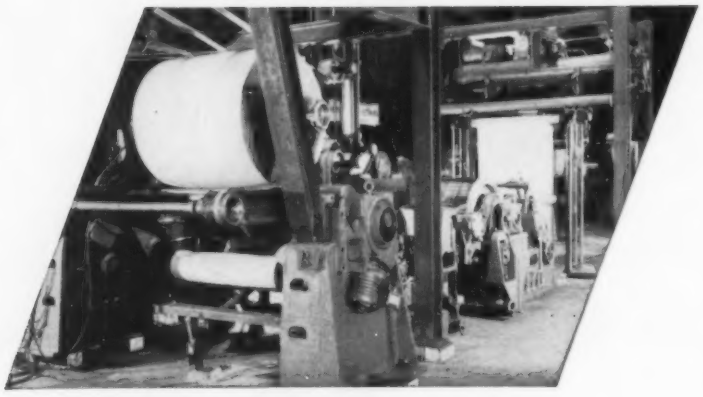


WITH DILTS POLYETHYLENE EXTRUSION LAMINATOR





You buy...

The experience of the leading converters who offered their ideas and data to provide the optimum operating features in the laminator.

The experience of the leading extruder manufacturer whose equipment Dilts includes to provide you with a complete package installation.

The experience of Dilts—designers of high speed converting machinery and experts in continuous unwinding and winding equipment which is so essential to successful production on Polyethylene laminators.

Model PL-1000 shown for operation to 1000 FPM; also available, Model PL-400 for operation to 400 FPM. Write for further details.

Dilts

THE BLACK CLAWSON COMPANY
DILTS MACHINE WORKS DIVISION
FULTON, NEW YORK

Investigate All The Advantages of Plastoleins®

DOZ DIOZ

The Most Versatile LOW-TEMPERATURE *Plasticizers Available*

- *Unmatched Low-Temperature Flexibility*
- *Unusually Low Volatility*
- *Low Water Extraction*
- *Excellent Heat & Light Stability*
- *High Plasticizing Efficiency*
- *Extremely Low Soapy-Water Extraction*

Plastoleins 9058 DOZ (di-2-ethylhexyl azelate) and 9057 DIOZ (di-iso-octyl azelate) possess all the properties of a basic plasticizer and...in addition, offer all the advantages of low-temperature flexibility.

This balanced combination of important properties has led to its extensive use in all types of vinyl compounds including calendered and cast films, calendered sheeting, calendered and dispersion coated fabrics, and all types of extruded products.

Why not give your product better performance and extra sales-appeal by using DOZ or DIOZ. Write to Dept. F-11 today for descriptive literature and samples of Plastolein 9058 DOZ (di-2-ethylhexyl azelate) or Plastolein 9057 DIOZ (di-iso-octyl azelate).

DOZ DOZ DIOZ DOZ DIOZ DOZ DIOZ DOZ DIOZ DOZ DOZ DIOZ DOZ DOZ DIOZ DOZ DIOZ

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HITCH YOUR PRODUCTION TO A NEW STAR . . .

FULLY AUTOMATIC PRODUCTION NOW IS POSSIBLE WITH THE IMPROVED LEWIS "4". New and extremely sensitive low-pressure closing controls provide absolute safety for molds and operators . . . permit "hands off" production. These new controls feature infinitely variable adjustment and allow machine to close at normal speed with very low hydraulic pressure. If no obstruction is encountered when the moving platen reaches pre-set point, final high-pressure close is effected instantly and automatically. When moving platen meets slightest resistance in closing, the machine stops immediately and activates a warning bell and light.

The LEWIS "4" handles almost any plastics material . . . will mold intricate 2 to 3-ounce large area parts originally produced on 8-ounce equipment. Small and sturdily constructed, Model "4" provides multiple shot injection and fast operation for high production with minimum scrap and maintenance.

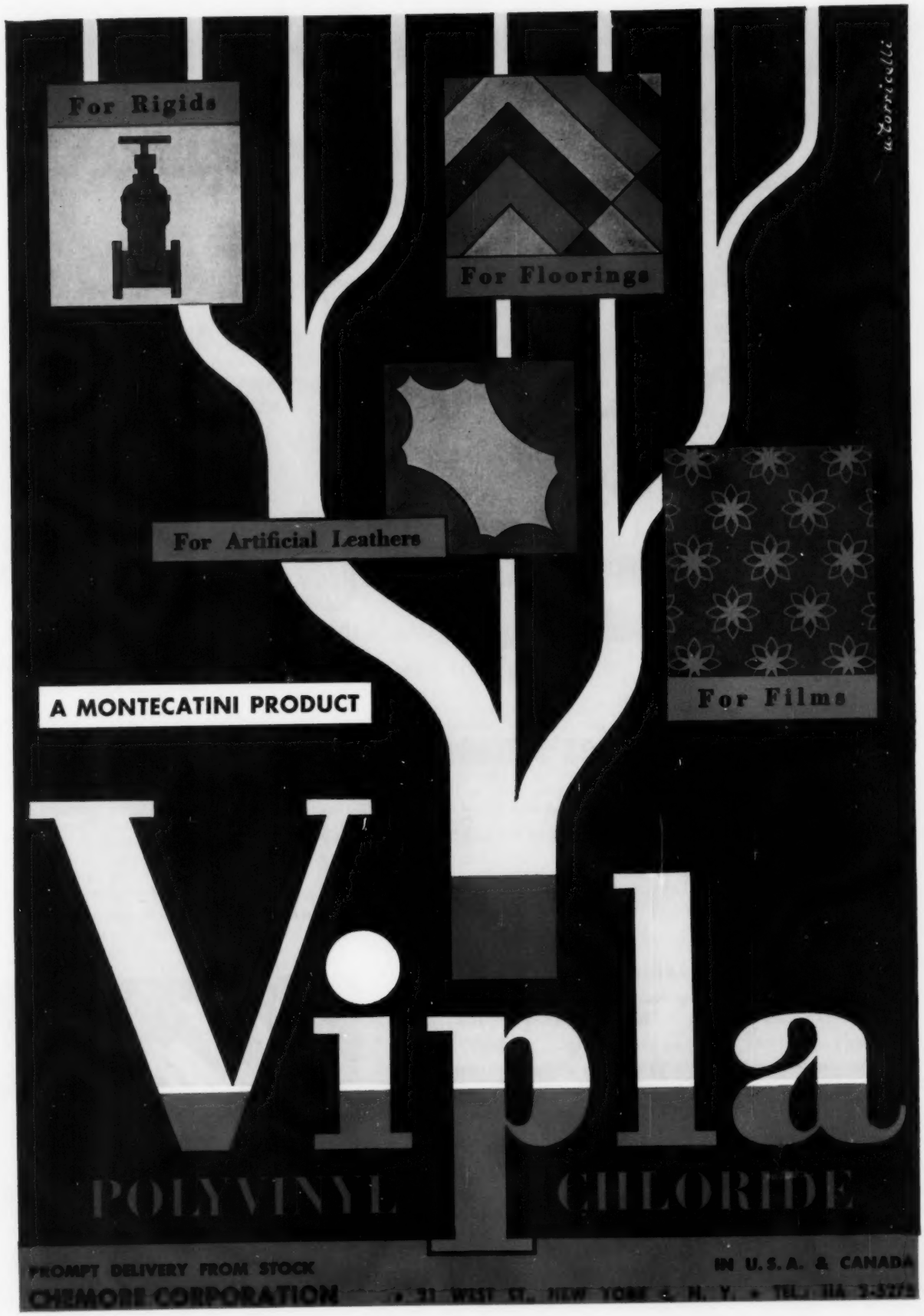
Write for BULLETIN 101 for additional details.

3071-LW

THE LEWIS "4" INJECTION MOLDING MACHINE

LEWIS

THE LEWIS WELDING & ENGINEERING CORPORATION
11 INTERSTATE STREET • BEDFORD, OHIO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Vornado Air Conditioner Front for
The O. A. Sutton Corporation
Wichita 1, Kansas

. . . increases Sales Appeal and cuts Cost

Hobby horses to air conditioners, it pays to keep your product up to the minute in plastics. New materials, modern techniques bring product improvements that *increase sales appeal and cut costs.*

Give your product the benefit of Amos experience and ingenuity . . . with full facilities for engineering your product *correctly* and carrying it through *every step* of specialized production:

Product design . . . engineering . . . mold building . . . molding with 4 to 300-ounce machine capacity . . . conveyorized assembly and finishing . . . vacuum plating . . . silk screening . . . hot stamping . . . roller coating . . . printing . . . spray painting — all under one roof — no divided responsibility.

No obligation—write, wire or phone your inquiry to:

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MOLDED PLASTICS...
Custom Injection
Molding & Finishing Specialists

In Every Industry . . .
for Plastics applications . . . look first to Amos

Full-speed operation of Modern Multi-Color Gravure Presses possible with new ADP Inks

Printers of plastic film and sheeting like the new **adp** vinyl inks because these almost-instantaneous drying inks can be printed at full speed on the fastest and most efficient gravure presses. This permits the printer to realize the full capacity of his presses and to reap the maximum return on his plant investment.

The speed of drying can be slowed down, however, **adp** points out, to allow the inks to be run satisfactorily on slower presses or for printing large 72-inch repeats for such items as tablecloths. When thus slowed down, the new **adp** inks will not dry in the engravings *before* printing or before reimmersion in the ink reservoir *after* printing.

In preparing these new inks for the press, **adp** recommends the following rule of thumb: mix **adp**'s reducing clear with an equal part of thinner, then with this mixture adjust the ink to the desired printing tone. Drying speed can be slowed down still further, when necessary, by varying the thinners used with the reducing clear. When an extremely fast-drying ink is indicated, the thinner can be a mixture of 75% MEK and 25% toluol. If a slower ink is required, the thinner can be MIBK or even cellosolve acetate. It may even be desirable to add xylol up to 10%.

ADP's new Inks had thorough field-testing

Before being placed on the market, **adp**'s new vinyl inks were given extensive field-testing under actual production conditions in the plants of a number of leading plastics printers. These tests confirmed the results previously obtained in **adp**'s own laboratories at Philadelphia and Newark, N. J. In many of these plants, the superior results obtained with the new **adp** inks led to their being adopted for regular production.

Plastics printers hail new adp Gravure Inks

. . . fast-drying formula, anti-blocking properties cure production headaches! . . . brilliant, clean colors give colorists greater design freedom!

Manufacturers of shower curtains, draperies, tablecloths, upholstery, luggage materials, and similar products have enthusiastically received the new line of fast-drying vinyl inks for gravure printing on plastic film and sheeting recently introduced by Acheson Dispersed Pigments Company, Philadelphia, Pa. Prompt acceptance of the new inks is ascribed to their fast-dry, outstanding anti-blocking properties and brilliant, clean colors.

Entirely different from any gravure inks ever before offered, the new **adp** inks embody a revolutionary new ink-making technique which gives fast and complete solvent release. This results in anti-blocking properties which cure many of the production headaches usually associated with gravure printing on vinyl.

Colorists especially like the new **adp** inks. The brilliant, clean colors give greater freedom for their designs and permit effects of unparalleled color and brilliance. The pigments used for the new inks have been selected for maximum brilliance and good opacity. The finished printed result shows practically the same cleanness as transparent colors and is free from the muddy undertones that are sometimes unavoidable with other gravure inks in obtaining the desired amount of opacity.

The new **adp** inks are available in black, white, and ten other colors. Samples are available free on request, and manufacturers and printers are invited to send for a gray scale in color which shows the tonal effects that can be obtained with these new inks. Write to Acheson Dispersed Pigments Co., 2252 E. Ontario St., Philadelphia 34, Pa.

Available in Europe, too!

adp's new vinyl inks are available to European plastics printers through Acheson Colloids Ltd., Slough, Bucks., England, a unit of Acheson Industries, Inc.

"You can't block this new ADP ink". . . reports leading Shower-Curtain maker

Striking proof of the excellent anti-blocking properties of **adp**'s new fast-drying vinyl inks comes from the printing department of a large Eastern manufacturer of plastic draperies and shower-curtains.

In a severe test-run of the new **adp** inks, plastic shower curtains were printed on vinyl sheet in multiple colors at normal gravure printing speeds. The curtains were then wound up tighter than usual, stored under hotter than normal conditions for periods of 10 days to two weeks, and unrolled.

The plastic sheet unwound with only the normal amount of pull. No offsetting of the pattern had taken place, and only the normal amount of sticking of the glossy surface was observed.

With the fast-drying new **adp** inks, no interleaving material is required, contrary to the usual practice when more than one color is printed. This saving—the material costs almost a penny a yard and cannot be re-used—runs to a sizable figure in the average production run.

Blocking properties of the new inks are outstanding on standard formulations of film and sheeting. The inks do not block immediately after printing, nor are they affected later by migration of the plasticizer from the plastic sheet into the ink film.

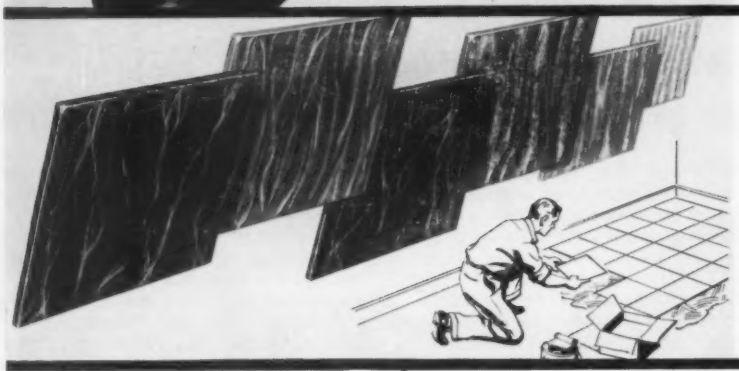
NEW Firestone EXON 468

INCREASES BANBURY OUTPUT BY 10 to 25%!

in VINYL PHONOGRAPH RECORDS

•

Using EXON 468, you can now process the finest vinyl phonograph records with greater efficiency and economy than ever before!



in VINYL ASBESTOS FLOOR TILE

•

Use EXON 468 as the base resin in vinyl asbestos flooring formulations . . . for new production economies—and superior end products!

SOME OUTSTANDING PROPERTIES OF *EXON 468*

•

- A low-temperature processing vinyl chloride copolymer
- High bulking density
- Fast fusion at low heat
- Compatible with conventional vinyl plasticizers, stabilizers and pigments
- High thermoplasticity
- Good heat and light stability

The higher bulking density of EXON 468 speeds your output from the banbury by 10 to 25%.

EXON 468 is a superior resin in every detail . . . it offers easy processability, as it permits fast fusion at reduced temperatures.

It will pay you to investigate the possibilities of EXON 468. Contact Firestone for suggestions on using EXON 468 in developing new products.

Continuing Firestone research aids industry by creating specific resins for specific needs. EXON 468 is but one example. Whatever your problem, the answer may be found in the ever growing line of versatile Firestone EXON resins.

Firestone EXON

For complete information or consultation on any processing problem . . . call or write

CHEMICAL SALES DIVISION

- *Firestone Plastics Company, Dept. 2G, Pottstown, Pa.*
- *Division of The Firestone Tire & Rubber Company*

SAY KREIDEL PLASTICS OFFICIALS

Kreidel Plastics officials are shown here examining production from their latest NRM Extruder. Right to left are Frank Tonya, President; Bill Beal, Secretary and Production Supt., and Al Muren, Treasurer. From a small beginning with one NRM Extruder in a plant they built themselves, these men now service extrusion accounts over an 18-State area, specializing in extrusions for the window industry. They're currently planning a bigger plant, with more NRM Extruders, to handle their rapidly growing business.

WITH NRM

EXTRUDERS

Frank Tonya, President of Kreidel Plastics, Inc., Barberton, Ohio, said: "The first NRM, with which we started in business, has been operated continuously at peak output, yet in four years it hasn't required a nickel's worth of repair. This *dependable* ability to turn time into money has sold us on NRM Extruders. We're planning a new and larger plant, and of course it will be completely NRM equipped."

We're glad NRM Extruders are playing such an important part in the success of Kreidel Plastics, Inc. We know, too, that NRM Extruders are contributing just as importantly to the profit and growth of *many* plastics processors — all over the world — by their capacity for high output of top-quality extrusions from *all* thermoplastics. Write us today for NRM facts and details, if you're planning to purchase plastic extruders and equipment. See why big and little plastics manufacturers *everywhere* are profiting with NRM Extruders. A postcard will do, and there's no obligation.

2284

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NRM

Creative Engineering

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its cheapness?
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What do you rate highest about polystyrene?
its remarkable freedom from Design limitations?

All three points are important . . . but most important of all, says many a plastics man, is the name Kleestron Colorant Blend 604. With that brand you get all the usual virtues of polystyrene plus a *versatility* that has yet to be bettered. If you rate polystyrene high among plastics, you'll surely rate Kleestron still higher.

the Versatile plastic

Supplied as fines, granules or a mixture of both

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BLEND 604

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...save up to 50% of finishing time

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reports . . . "Our high level of quality workmanship is backed by the exclusive use of Cascade die steel on non-specified orders for plastic molds. Pre-hardened Cascade's superior machinability has resulted in surfaces that save up to 50% of finishing time while providing surface quality in keeping with our prescribed high standards".

Precipitation hardened Cascade Die Steel is uniform throughout . . . uniformity of hardness, material structure . . . factors that consistently result in better machinability and finer finished surfaces. Send today for Cascade Data Sheet.

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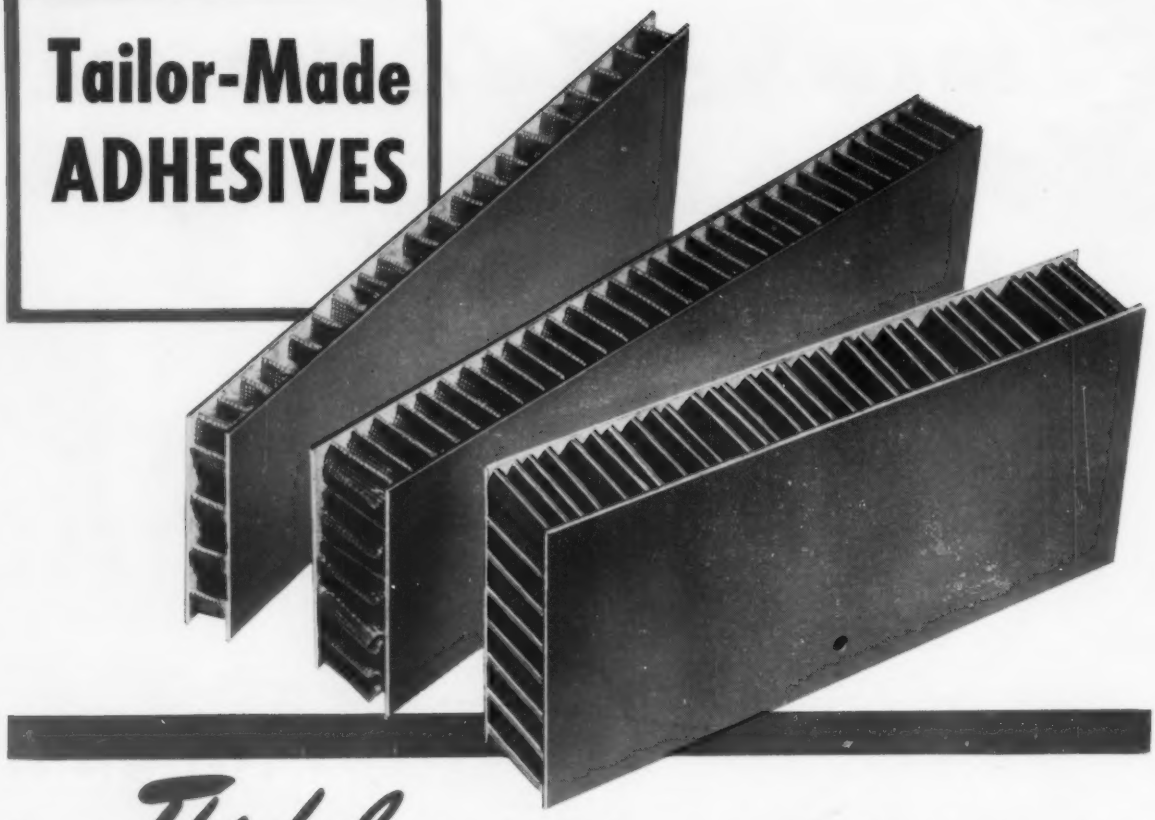
Tailor-Made ADHESIVES



from *Thiokol*® Liquid Polymers and Liquid Epoxies

Built-in flexibility is imparted to epoxy adhesives by combination of "Thiokol" Liquid Polymers with Liquid Epoxies. Properties can be tailor-made for specific applications by varying the amount of "Thiokol" Liquid Polymer in the combination.

These combinations have resulted in a wide extension of the utility of epoxy-based adhesives. By themselves, epoxy-based adhesives display excellent adhesion to many materials, but are too brittle for many applications. They lack peel, impact and bend resistance. These defects are overcome by incorporating flexibility with "Thiokol" Liquid Polymers. The following typical improvements result:

HIGH PEEL, BEND AND IMPACT STRENGTH • PERMANENT FLEXIBILITY OVER A BROAD TEMPERATURE RANGE
HIGH SHEAR STRENGTHS WITH ROOM TEMPERATURE CURES • IMPROVED RESISTANCE TO MANY SOLVENTS
LOWER SHRINKAGE ON CURING • FLUID MIXES WITHOUT RESORT TO SOLVENTS

"Thiokol" Liquid Polymer/Epoxy adhesives are versatile. They are excellent adhesives for plastics, fibers, leather, rubber, aluminum, steel, copper, tin, zinc, wood, glass and ceramics.

An aluminum honeycomb structure bonded with a "Thiokol" Liquid Polymer/Epoxy adhesive is shown in the illustration. Other recent applications include bonding fiber glass structures . . . adhering fiber glass laminates to wood and ceramics . . . and bonding rubber to zinc-plated steel.

The potentialities of "Thiokol" Liquid Polymer/Epoxy Resin adhesives have not yet been fully exploited. Aside from their ability to solve difficult adhesive problems, they offer the possibility of simplifying fabrication methods.

For complete information on the properties of these adhesives, write:

Thiokol
Chemical Corporation

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In Canada: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario

Call ERIE for Quality

CUSTOM MOLDED PLASTICS

This distinctively modern telephone pedestal is custom thermo-plastic injection molded by ERIE for the new N-541 telephone of The North Electric Manufacturing Company.

The streamlined design represents a complex molding job because of the concealed ribs, wells and posts; and the extremely high finish required on the exposed surface. And, to quote the customer, "The high impact case—practically unbreakable—may be removed intact exposing all base mounted parts for easy access."

This is another instance of Erie's proven ability to do the unusual as well as to do the usual with unusual competence.

Write for your copy of bulletin, "Who We Are . . . What We Do in Plastics."

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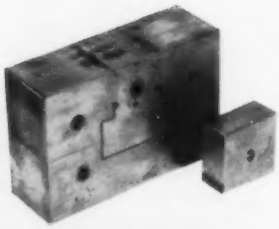
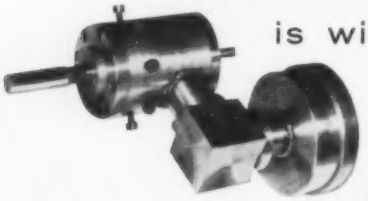
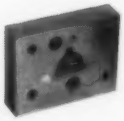
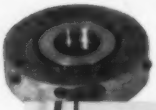


THE RIGHT BEGINNING for any extrusion, large or small is with a ROBBINS DIE





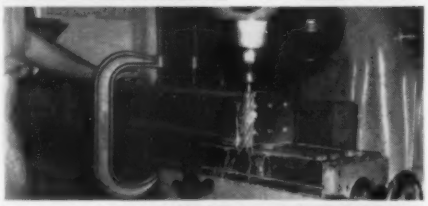


. . . and we're ready to prove that it pays to buy extrusion dies from a specialist. Write for an estimate—dozens of companies (domestic and foreign) have switched to Robbins. No obligation, of course. You can phone us at 2-4060 Elkhart, Indiana.

Our engineers have designed hundreds of extrusion dies. They're specialists. That's why a Robbins die generally costs less . . . and invariably have a greater yield!

DESIGN

Single orifice to complicated sheeting or pipe dies, Robbins tools every job to perfection. Die makers with years of experience and the newest in machine tools build the dies that answer your extrusion problems.



MANUFACTURE

Final polish, assembly and inspection are specialist operations, too. Here, again, specialization pays off in quality and performance of every Robbins built die.

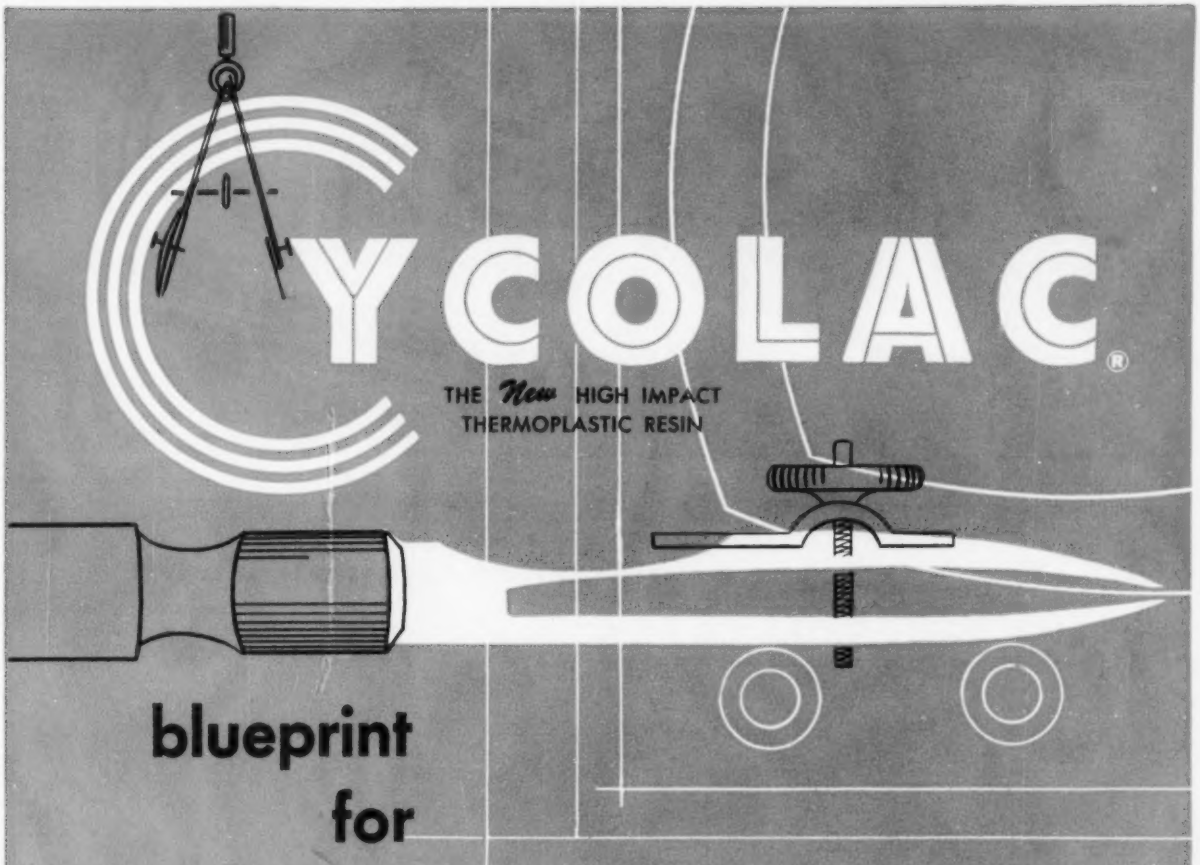
HAND FINISHING

When a Robbins die is delivered, you know it's right. Because we test it—prove it—by submitting samples from a test run in our own plant. In addition, our engineers are available to help you set up your job.

TESTING

Robbins
never say die . . . say Robbins die

TOOL AND DIE COMPANY
1430 Mishawaka Street, Elkhart, Indiana



CYCOLAC®

THE *New* HIGH IMPACT
THERMOPLASTIC RESIN

blueprint for your SALES FUTURE

HERE'S EXCITING NEWS FOR EVERY MANUFACTURER OF RADIO AND TELEVISION CABINETS . . .

Injection-molded CYCOLAC radio and TV cabinets give you the very basic material properties you are looking for: Rugged toughness plus lightweight . . . Bright colors accented by high gloss . . . Excellent electrical properties combined with greater dimensional stability. Yes, and high heat distortion is another factor that points to importance of CYCOLAC in the manufacture of your radio and TV cabinets.

GET THE FACTS: Write for Technical Literature **TODAY!**

CYCOLAC — the one uniform resin that makes good products BETTER

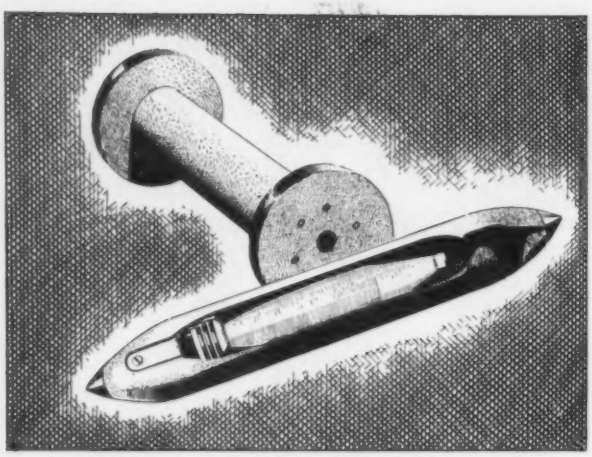
Marbon

MARBON CORP.

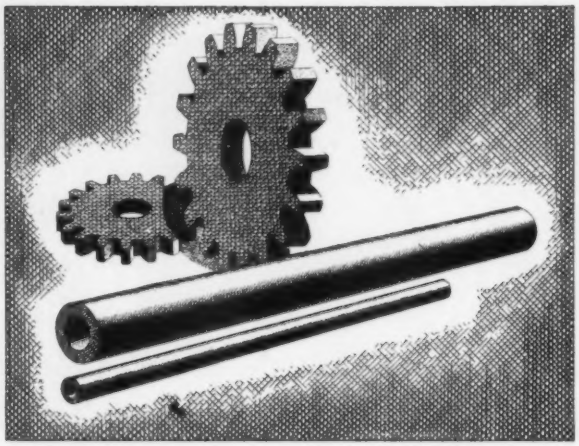
GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

MARBON . . . . Precision Resins for Precision Made Products



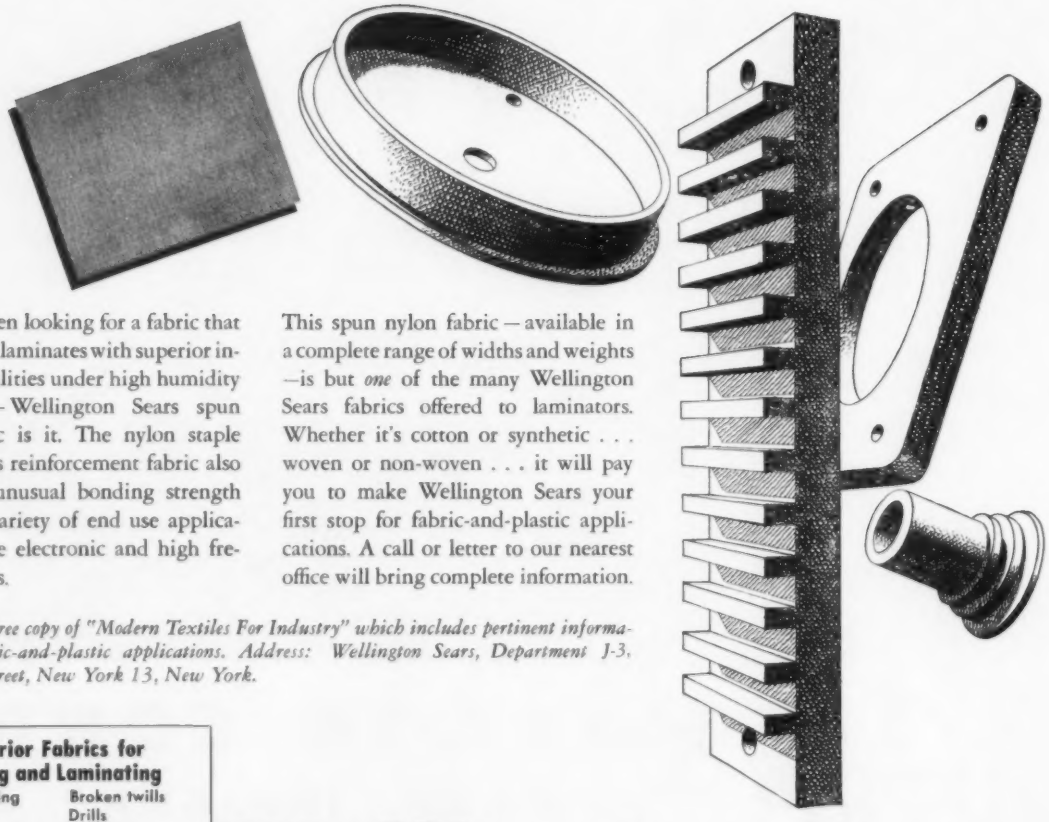
Lantuck non-woven fabric is an economical filler for laminates requiring superior mechanical strength and easy machineability.



Wellington Sears Superior army duck is a heavy, rugged fabric with hard-gripping texture—ideal for shock-resistant laminates.

You get superior electrical laminates with

WELLINGTON SEARS *Spun Nylon Fabric*



If you've been looking for a fabric that will provide laminates with superior insulating qualities under high humidity conditions — Wellington Sears spun nylon fabric is it. The nylon staple fibers in this reinforcement fabric also contribute unusual bonding strength in a large variety of end use applications for the electronic and high frequency fields.

This spun nylon fabric — available in a complete range of widths and weights —is but *one* of the many Wellington Sears fabrics offered to laminators. Whether it's cotton or synthetic . . . woven or non-woven . . . it will pay you to make Wellington Sears your first stop for fabric-and-plastic applications. A call or letter to our nearest office will bring complete information.

Write for a free copy of "Modern Textiles For Industry" which includes pertinent information on fabric-and-plastic applications. Address: Wellington Sears, Department J-3, 65 Worth Street, New York 13, New York.

Superior Fabrics for Coating and Laminating

- Single filling ducks
- Army ducks
- Single and plied-yarn chafers
- Special ducks
- Sateens
- Twills
- Broken twills
- Drills
- Sheetings
- Nylon, rayon, Orlon* and other synthetics
- Lantuck non-woven fabrics

*DuPont's trademark for its acrylic fiber

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Offices in: Atlanta • Boston • Chicago • Detroit • Los Angeles • New Orleans • Philadelphia • San Francisco • St Louis

For PLASTICS — WORBLA

Manufacturers of plastics for over thirty years.

WORBLA-PLASTICS have proved their worth
So that you may see for yourself — we shall gladly provide you with samples.

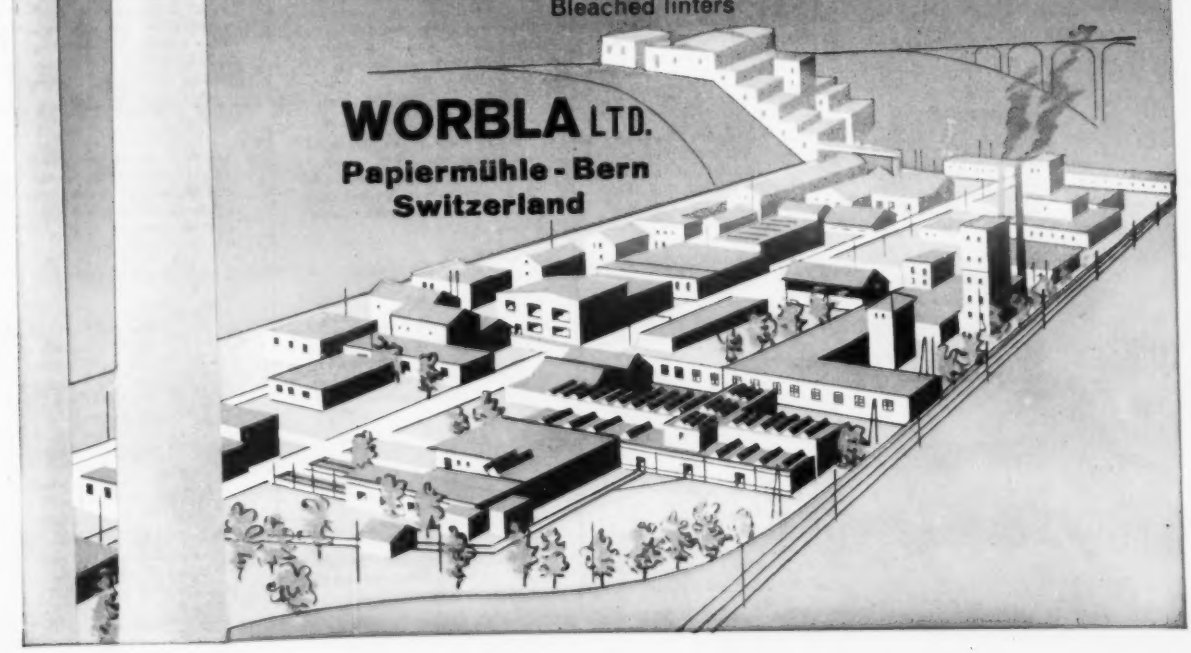
WOPALOID — Celluloid in sheets, tubes and rods.

WOPALON — Cellulose Acetate in sheets, tubes and rods.

WOPALIT — Acetate powder for injection moulding and extrusion.

WOPAVIN — PVC (Polyvinylchloride) in calandered and pressed foils and sheets, tubes, rods and profiles. Compounds for injection moulding and extrusion.

WORBLA — Nitrocellulose for lacquers and technical uses.
Bleached linters



WORBLA LTD.
Papiermühle - Bern
Switzerland

Make sure you get Fasteners **HEADED FOR SAVINGS**

. . . give millions of assembly hands a head start

Screws are sometimes like people. If they "lose their heads" under pressure — if they turn out to be "softies" if they "don't square up," they are *headed for trouble* . . . and so is your assembly line.

P-K Self-tapping Screws are headed for savings — not only headed, but threaded, pointed, and heat treated with the same purpose — to keep assembly lines trouble-free.

When your design calls for assembly with Self-tapping Screws, you can plan on assembly savings up to 50% and more over slower, more complicated fastening methods. To make sure your planned savings *pay off* — specify P-K. Parker-Kalon Division, General American Transportation Corporation, 200 Varick Street, New York 14.

PARKER-KALON®

	Type A	Type Z†	HEX HEAD Type Z†
type	SLOTTED OR PHILLIPS HEAD	†A.S.A. Designation Type B — SLOTTED OR PHILLIPS HEAD	†A.S.A. Designation Type B
uses	For fastenings to light gage (.015" to .050") sheet metals, asbestos compositions, resin impregnated plywood, wood, etc. The original Sheet Metal Screw. Forms its own matching thread as it is turned in. Can be removed and replaced.	For fastenings to light and heavy gage (.015" to .200") sheet metals, non-ferrous castings, plastics, resin impregnated plywood, asbestos compositions, etc. Forms its own matching thread as it is turned in. Can be removed and replaced.	For fastenings to light and heavy gage sheet metals (.015" to .200") and structural steel (.200" to ½"), non-ferrous castings, plastics, resin impregnated plywood, asbestos compositions, etc. Forms thread as it is turned in with socket wrench. Can be removed and replaced.
metals	Standard screws are hardened steel. Type 302 (18-8) Stainless Steel, non-hardenable (standard in some sizes). Type 410 Corrosion-resistant Steel, hardened (special order). Brass (special order).	Standard screws are hardened steel. Type 302 (18-8) Stainless Steel, non-hardenable (standard in some sizes). Type 410 Corrosion-resistant Steel, hardened (special order).	Standard screws are hardened steel. Type 302 (18-8), non-hardenable Stainless Steel, and Type 410, hardened, Corrosion-resistant Steel (special order).
special forms	Can be furnished on special order, quantity permitting. Some variations of the standard Type A form are shown.	Can be furnished on special order, quantity permitting. Some variations of the standard Type Z form are shown.	Can be furnished on special order, quantity permitting. Some variations of the standard Hex Head Type Z form are shown.
staps	**Type A STAPS** The washer illustrated is a laminated metal and neoprene rubber disc, recommended for most applications of Type A Staps. Other types of washers can be used.	**Type Z STAPS** Since head styles are same as those of Type A, STAPS with Type Z thread form can be furnished. Metal backed neoprene washer is recommended.	**Hex Head Type Z STAPS** Shown with laminated metal and neoprene rubber disc, recommended for most applications. Other types of washers can be used.

P-K STANDARDS

PROTECT YOU AGAINST THESE AND MANY OTHER SYMPTOMS OF SCREWS HEADED FOR TROUBLE.

These symptoms are hard to see at a glance, but the effects of screw failure (parts spoilage, high reclamation expense, hidden weakness) show up quickly in mounting assembly costs and customer complaints.

The First SELF-TAPPING SCREWS *First Today*

THE LEADING CHOICE FOR METAL AND PLASTIC FASTENING ECONOMY

Type F-Z

SLOTTED OR PHILLIPS HEAD

For fastenings to comparatively thin sections and bosses in friable and brittle plastics. Five cutting flutes distribute pressure evenly, permit chips to drop to bottom of hole. Coarse threads offer greater resistance to stripping out.

Type F-Z Screws are made on special order only, quantity permitting. Can be furnished in plain steel or stainless steel.

Can be furnished on special order, quantity permitting. Some variations of the standard Type F-Z are shown.

Type F-Z STAPS

Since head styles are same as those of Type A, STAPS with Type F-Z thread form can be furnished. Metal backed neoprene washer is recommended.

Type F

SLOTTED OR PHILLIPS HEAD

For fastenings to ferrous and non-ferrous castings, bronze or brass forgings, heavy gage sheet metals, structural steel, plastics, resin impregnated plywood, etc. Cuts standard machine screw thread as it is driven. Can be removed and replaced.

Standard screws are hardened steel. Type 410 Corrosion-resistant Steel, hardened, (special order).

Modifications can be furnished as needed on special order, quantity permitting. Some variations of the standard Type F form are shown.

Type F STAPS

Since head styles are same as those of Type A, STAPS with Type F thread form can be furnished. Metal backed neoprene washer is recommended.

Type U

For permanent fastenings to ferrous and non-ferrous castings, heavy gage sheet metals, plastics, etc. Cannot readily be removed.

Standard screws are hardened steel. Type 410 Corrosion-resistant Steel, hardened, (special order).

Some variations of the standard Type U form are shown. Modifications can be furnished as needed on special order, quantity permit-

Type U STAPS

Shown with molded neoprene washer, recommended for most applications of Type U STAPS. Other types of washers can be used.

HEAD STYLES

Types A, Z, F, and F-Z are available with any of these commonly used head styles—ROUND, BINDING, STOVE, FLAT, OVAL, HEX.

FINISHES

Standard plated finishes are Zinc, Brass, Nickel, Cadmium, or Parkerized. Other finishes on special order.

STAPS

are P-K Fasteners with pre-assembled neoprene washers. They have many applications for effective control of leaks, squeaks, electrolysis and crazing in enameled surfaces. Furnished to special order, quantity permitting.

TYPE 21

A Drive Screw for fastening fibre, leather, fabric, cardboard, etc., to sheet metal. For permanent fastenings.

Before You Buy Any...

Plastic Molding Machine

be sure to see the New Improved
High Speed • Fully Automatic

MOSLO Model 73

FOR
PERFORMANCE
CAPACITY
DEPENDABILITY
SIMPLICITY
SAFETY
APPEARANCE

SEE THE NEW RE-DESIGNED MOSLO LINE
—FULLY AUTOMATIC FOR ALL REQUIREMENTS

Before you buy any plastic molding machine, either fully automatic or hand operated, we urge you to investigate the features of the MOSLO line. These are the machines that are setting new and higher standard of quality production for many types of molding operations. They have the effective controls, rugged construction, reliability and speed that make profitable production possible, year after year, in all lines of the plastic molding industry. Savings extend to materials and mold cost as well as productive time.

Hydraulic Manifold

The "Heart" of a Moslo Machine

All hydraulic valves are mounted on a convenient hydraulic manifold. This manifold eliminates 60% of the pipe fittings normally installed in an injection molding machine. It simplifies maintenance problems and eliminates many potential oil leaks.

MODEL 73

- 2 oz. injection capacity per shot
- 1200 cycles per hour
- 25 lbs. per hr. *plus* plasticizing capacity
- Molds 20 square inches of area *plus*
- Material hopper capacity—40 lbs.
- Mold opening 6"

MODEL 75

- 2-3 oz. injection capacity per shot
- 740 cycles per hour
- 50 lbs. per hr. plasticizing capacity
- Molds 40 square in. of area
- 50 lbs. capacity of material hopper

This machine is available with mold arrangement and cycle to fit requirements of mold opening from 8 to 16 inches.

MODEL 80

- 3-4 oz. injection capacity per shot
- 780 cycles per hour (dry run)
- 75 lbs. per hr. plasticizing capacity
- Molds 60 sq. inches of area
- 60 lbs. capacity of material hopper
- Mold opening 8"

Write, wire or call to arrange a demonstration. We have a Model 73 set up for a working demonstration at your convenience.

MOSLO MACHINERY COMPANY

2443 PROSPECT AVENUE • CLEVELAND 15, OHIO

2 NEW STABILIZERS FOR VINYL GARDEN HOSE

MARK M
OR
MARK XV

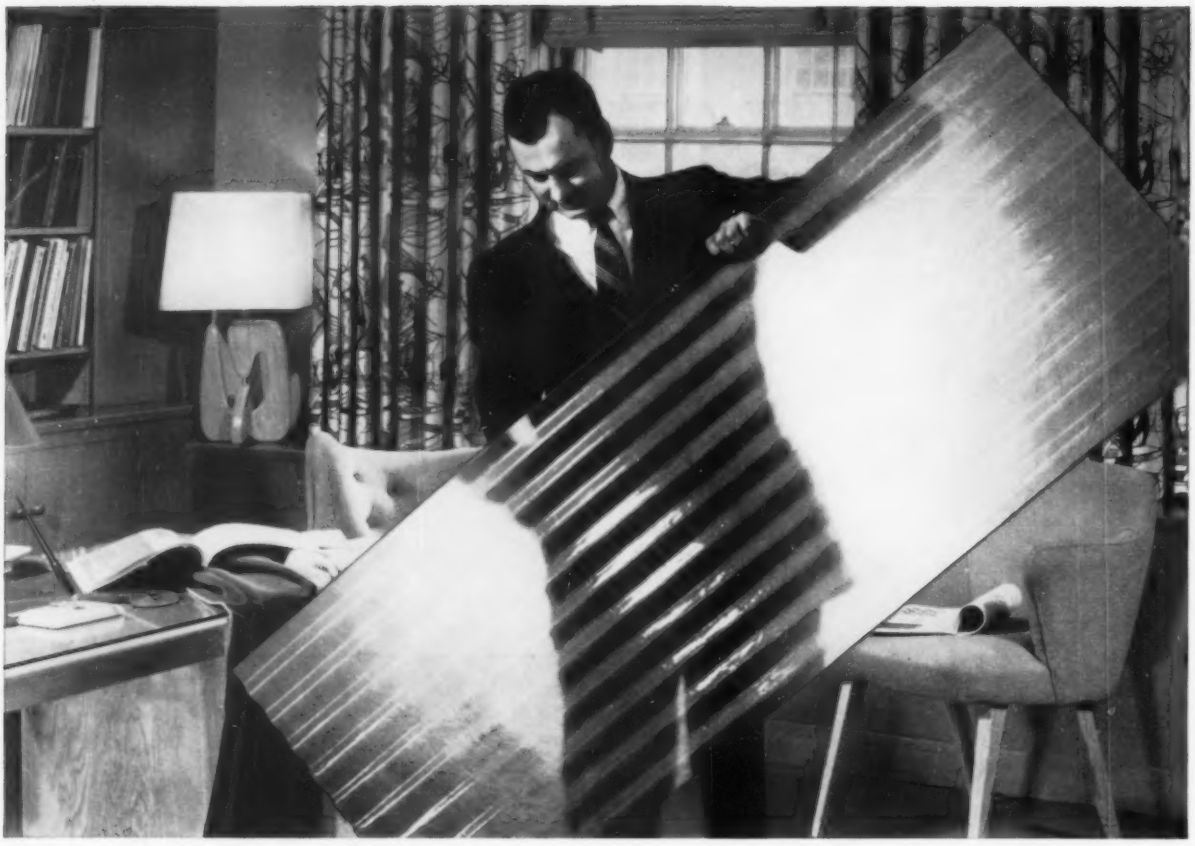
- SPARKLING CLARITY
- IMPROVED WEATHERING
- OUTSTANDING HEAT STABILITY

Both stabilizers are in convenient liquid form . . . mix readily with all plastic formulations. Both are lower in cost than any other stabilizers of comparable advantage.

If the vinyls you produce require these important characteristics, now is the time to investigate Mark M or Mark XV Stabilizers. *Write today for Technical Bulletin 11.*

"PURR-FECTION"

ARGUS CHEMICAL CORPORATION
633 COURT STREET BROOKLYN 31, N. Y.



Now you can supply polyester-glass fiber panels with ***specific flame resistance***

More and more of your customers will be asking for polyester-glass fiber panels to meet building code requirements that call for a definite flame spread rating . . . panels and sheets you can make with HETRON* polyester.

"Locked-in" fire resistance

Structural panels, sheets, and other shapes made with HETRON are *permanently* self-extinguishing. Typical flame spread ratings of 75 or less (compared with 100 for red oak) by independent laboratory tests, place HETRON-based panels in a bracket equivalent to the Building Officials Conference of America classification of "slow-burning." Specific flame resistance is permanently, chemically locked in.

HETRON resins, in addition to their flame resistance, have high chemical resistance, low shrinkage on cure, excellent electrical properties, great resistance to heat degradation, and low permeability to air and water vapor.

They can be handled by standard techniques for curing, laminating, casting, and machining.

Write for complete technical data sheets listing properties of the liquid resins, cured unfilled resins, and glass cloth laminates. They include general handling and curing recommendations and other useful information.

*Trade Mark

HOOKER CHEMICALS

From the Salt of the Earth

4-1669

HOOKER ELECTROCHEMICAL COMPANY

18-47TH STREET, NIAGARA FALLS, NEW YORK

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

for superior light fastness and flushability

HELIOGEN® PRESSCAKES

phthalocyanine blues and greens of exceptional brilliance and workability

Clear, clean, brilliant HELIOGEN Colors are the finest nonfading blues and greens available today... always in demand where quality comes first.

Heliogen Blue BDV Presscake	Heliogen Blue BNC Presscake Special	Heliogen Blue BG Presscake Special	Heliogen Green GB Presscake Special
Dark, transparent mass tones	Stable dimensionally	Peacock blue shade	Bluer shade, with added strength
Crystallizing type	Noncrystallizing	Noncrystallizing	Noncrystallizing
No surfactants	No surfactants	No surfactants	No surfactants
Nonbleeding	Slight bleeding	Nonbleeding Heat resistant	Nonbleeding
24% dry content (approx.)	25% dry content (approx.)	40% dry content (approx.)	29% dry content (approx.)
FOR FLUSHING IN:			
Oil base paints Plastics Printing inks Varnishes Textile printing	Plastics Printing inks Varnishes Textile printing Rubber base paints	Oil base paints Plastics Printing inks Varnishes Textile printing Rubber base paints Baking enamels Enamels	Oil base paints Plastics Printing inks Varnishes Textile printing Rubber base paints Baking enamels Enamels

For more complete information on HELIOGEN colors, send for our handsome free booklet.

From Research to Reality

gdc gaf

GENERAL DYESTUFF COMPANY

A SALES DIVISION OF GENERAL ANILINE & FILM CORPORATION

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"Thought for food"

Tote Boxes of U. S. Royalite!

Food Fair Stores, Inc.—7th largest, and fastest growing food chain in the nation—has *obviously* had *many* worthwhile thoughts on the handling and merchandising of food. And one of the latest is the use of *U. S. Royalite Tote Boxes* for the preparation and distribution of refrigerated meats, cheeses, fruits and vegetables.

Why U. S. Royalite?

Food Fair found U. S. Royalite boxes are so tough they can be banged around all day without cracking, chipping, or splintering—even at sub-freezing temperatures. *They're tough enough to outlast other types of containers a dozen times over!*

Extremely light, too, these Royalite tote boxes sharply reduce handling weight. And their special design allows both nesting when empty and positive, non-slip stacking when full.

And, of course, these U. S. Royalite tote boxes are completely non-toxic—unharmed by food juices and other chemicals encountered in food handling—approved by health authorities.

Whether *your* thoughts run to food, small parts, or practically *any* materials handling problem, chances are you'll find it's "another case for U. S. Royalite". Available in a range of sizes and attractive, clear-through colors, U. S. Royalite Tote Boxes have proved their value not only to Food Fair, but to manufacturers by the hundreds.

Why not write us today?

U.S. ROYALITE
TOUGH PLASTIC PRODUCTS®

US RUBBER

UNITED STATES RUBBER COMPANY
2638 NORTH PULASKI ROAD, CHICAGO 39, ILLINOIS

KNIT your profits

—at high speeds . . .

. . . with Fidelity's method of HOSE reinforcement

You can knit natural and synthetic yarns at speeds up to 1,000 feet per hour on rubber and plastic extrusions in continuous lengths. Hose is strong and *flexible*, adhesion is better, diameters are uniform.

By eliminating costly rewinding, treating and drying operations, electrically controlled Fidelity Hose Reinforcement Machines are setting new economy records in plants where they replace conventional braiders. These machines have been time tested by the world's leading Rubber Hose Manufacturers for nearly 20 years.

Write today for Catalog HR describing advantages and technical details. When in the Philadelphia area, visit the new showroom at our plant and see the Fidelity Hose Reinforcement Machine in operation.

Designers and Builders of Intricate, Automatic Precision Machines

SINCE 1911

FIDELITY MACHINE COMPANY, INC.

3908 - 18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

Export Dept.:
25 Beaver Street, New York 4, N. Y.

Canadian Representative:
W. J. Westaway Co., Ltd., Hamilton, Ontario, Canada.

Q. When is a smile a safety emblem?

A. When it is worn behind
the wheel of an automobile
by a person courteous enough
to do unto others as he
would like others to do unto him.

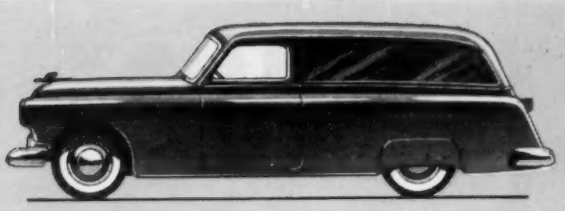
GREEN CROSS FOR SAFETY

A PUBLIC SERVICE PROJECT THE ADVERTISING COUNCIL

Be Careful... the life you save may be your own!

A public service message prepared by The Advertising Council in cooperation with the National Safety Council.

From colorful and durable panels for delivery trucks to handsome television cabinets...



Pittsburgh Selectron POLYESTER RESINS

Now Ready For A Thousand New Uses!

COUNTLESS products benefit from the combination of beauty and durability Pittsburgh SELECTRON Polyester Resins can give—and usually at reduced manufacturing costs.

SELECTRON Resins are used in products ranging from truck panels that withstand extreme hot and cold, rain, snow, and sleet to television cabinets that serve as focal points of beauty in homes everywhere.

SELECTRON Resins are thermo-setting polyesters which are available in consistency from a thin syrup to extremely high viscosity. They polymerize to form solids, with or without heat and with or without pressure.

When combined with such fillers as fiber glass, cotton, rayon, nylon, felt, sisal, paper, etc., SELECTRON Resins provide a new kind of material that is lighter than aluminum, yet—weight for weight—is stronger than steel. This material has great impact resistance and withstands the deteriorating influence of weather, sunlight, heat, abrasion and many chemicals. It can be molded in durable colors.

Parts in which SELECTRON Resins are used can be molded either by hand lay-up, direct molding, continuous lamination or pre-forming. These resins can also be used without fillers for casting, potting and impregnating.

Investigate the advantages of SELECTRON Resins that may make your products better looking, stronger and more durable. We'll be glad to have one of our engineers discuss your problems with you without cost or obligation. Such a visit may point the way to important production economies and added sales appeal.

SEND FOR FREE BOOKLET

● Write, wire or phone today for our new booklet containing description of SELECTRON Polyester Resins and explaining many of the ways in which they can be used. Pittsburgh Plate Glass Company, SELECTRON Products Division, Gateway Center, Pittsburgh, Pa.

Just a few products in which Pittsburgh SELECTRON Resins are now used—

Aircraft structural parts
Radomes for electronic equipment
Life floats
Ballistic panels
Helmets
Boat hulls
Machinery housing and guards
Trays
Tote boxes
Food lockers
Garbage pails
Baskets for automatic dishwashers
Baskets for automatic washers
Wash tubs
Tool chests
Shipping containers
Instrument cases
Laundry hampers
Kitchen containers
Fishing rods
Sinks
Street signs
Traffic signs
Fluorescent light fixtures
Television cabinets
Loudspeaker housings
Gas meter housings
Structural panels for offices and homes
Door and transom lights
Awnings and canopies
Greenhouse panels
Skylighting
Molded chairs
Prefabricated houses and garages
Truck bodies

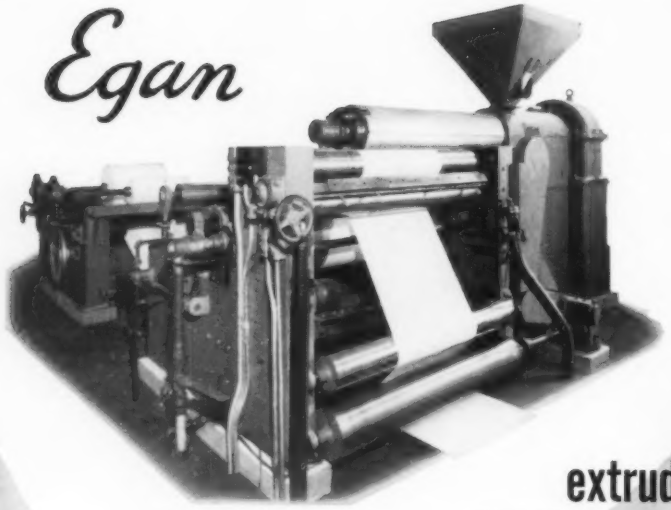
PITTSBURGH Selectron PPG

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

Egan



polyethylene extruder-laminator

(Above pictured installation at the Milford, N. J. plant of RIEGEL PAPER CORPORATION)

COMPLETE PACKAGED MACHINE

Combining in one unit, in engineered balance, two famous units—The Egan Extruder and the Egan Laminator. Planned for your current—or expanding—production, available in varying sizes—from 24" Pilot Plant Size to 96", 1000 feet per minute continuous operation. Machines are capable of coating on paper and paperboard, cellophane, foil, glassine and cloth.

30 **Egan machines now in operation.**

5 **Egan machines under construction.**
Approximately 75% of all polyethylene extruder-laminating machines now in operation anywhere in the world are Egan Equipment.

FRANK W. EGAN & COMPANY, Bound Brook, New Jersey

Designers and Builders of Machinery for the Paper Converting and Plastics Industries

Cable Address: "EGANCO"— Bound Brook, N. J.

Representatives: WEST COAST — John V. Roslund, 244 Pacific Bldg., Portland, Ore. MEXICO, D. F. — M. H. Gottfried, Avenida 16 De Septiembre, No. 10.

Licensees: GREAT BRITAIN — Bone Bros. Ltd., Wembley, Middlesex. FRANCE — Achard-Picard, Remy & Cie, 36 Rue d'Enghien, Paris X^e. ITALY — Emanuel & Ing. Leo Compagnano, Via Borromei 1 B/7, Milano. GERMANY — ER-WE-PA, Erkrath, bei Dusseldorf.

New, foamed polystyrene holds up under crushing weight!

KOPPERS Expandable Polystyrene is light as a pillow, yet it can support huge weights like the front end of this 4600-pound automobile. Actually the two low density plastic blocks in the picture are over 90% air by volume—and more amazing, they can carry up to a ton apiece without damage.

Foamed polystyrene is lighter than cork, ideal for use in life rafts, buoys and boats. And packages made with this plastic will resist shock and protect contents from damage.

The new plastic's low K factor (K=0.24) and high resistance to moisture also make it ideal for low temperature insulation.

Koppers Expandable Polystyrene comes in sugar-sized granules. You can mold it in *any* shape you want, and the density can be controlled. Molding equipment is inexpensive. And, because expandable polystyrene is sold in bead form, shipping costs are less than for expanded plastic sheets and logs.

If your product requires these features: lightness of weight, insulating properties, smoothness, paintable surfaces, strength and precisely molded features, Koppers Expandable Polystyrene is the right choice. For more information write for a copy of our free, illustrated booklet.

Koppers Plastics

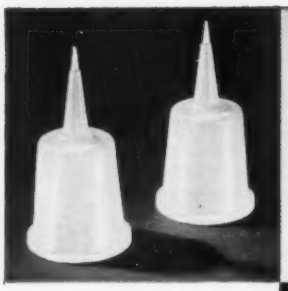
KOPPERS®

KOPPERS COMPANY, INC.

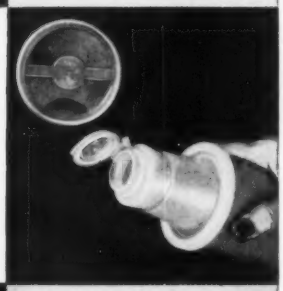
Chemical Division, Dept. MP-114, Pittsburgh 19, Pennsylvania

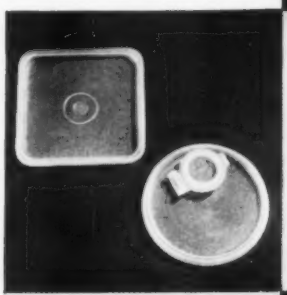
Sales Offices: New York · Boston · Philadelphia · Atlanta · Chicago · Detroit · Los Angeles

Koppers Plastics *make many products better and many better products possible.*



NOBODY HAS AS MUCH EXPERIENCE AT MOLDING POLYETHYLENE AS TUPPER!





Tupper Seals are air and liquid-tight flexible covers. The famous Pour All and Por Top covers are designed for easy dispensing. They are made in sizes to fit all Tupperware containers.

The logical molder for you to consult regarding that product or package of yours which is to be made of polyethylene is Tupper. Tupper has donc more than any other molder to make molded polyethylene a practical reality.

Aside from having designed, patented, and promoted successful seals, closures, and dispensers for polyethylene containers, the Tupper Corporation has vast experience in *every phase* of polyethylene packaging and polyethylene injection molding. This experience will be of major importance in improving your product, in reducing your costs, when Tupper goes to work for you.

Tupper's combination of experience, technical ingenuity, and the most modern equipment is at your service for the custom molding of your product in polyethylene. You can do no better than the best ...and the best at molding polyethylene is Tupper!

When equipped with Tupper Seals, Tupper Canisters, Sauce Dishes, Wonder Bowls, Cereal Bowls and Funnels in various sizes are the most versatile reusable containers you have ever seen.

TUPPER! TRADE MARK

TUPPER PRODUCTS ARE FULLY PROTECTED

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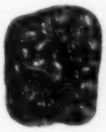
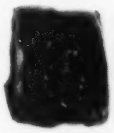
OVEN STABILITY AT 450°F*	0 MINUTES	10 MINUTES	20 MINUTES	30 MINUTES	40 MINUTES
Paraplex G-62—0% Dioctyl Phthalate—100%					
Paraplex G-62—25% Dioctyl Phthalate—75%					
Paraplex G-62—50% Dioctyl Phthalate—50%					
Paraplex G-62—100% Dioctyl Phthalate—0%					

STABILITY TESTS AT 450°F ON VINYL FILM PROVE VALUE OF PARAPLEX G-62 PLASTICIZER

PARAPLEX G-60, PARAPLEX G-62, and MONOPLEX S-71 for:

. . . Fast calendering
. . . Long-term durability
. . . Low stabilization costs
. . . Uniform color

The stabilizing effect of PARAPLEX G-62 in vinyl compounds is dramatically shown by the test samples above. PARAPLEX G-60 and MONOPLEX S-71 give similar results. Tests of durability, including Fade-Ometer, Weather-Ometer, and outdoor exposure, also demonstrate the ability of these plasticizer-stabilizers to impart resistance to embrittlement and discoloration.

In addition to their stabilizing effect, here are other key advantages of these Rohm & Haas plasticizers:

PARAPLEX G-60—polymeric-type, low volatility, good plasticizing efficiency, resistance to extraction by soap and water.

PARAPLEX G-62—polymeric-type, low volatility, low migration, excellent resistance to extraction by soapy water, oil and gasoline.

MONOPLEX S-71—monomeric-type, flexibility at low temperature, high plasticizing efficiency, lower volatility than conventional monomeric plasticizers.

*Tests based on this vinyl formulation:

Vinyl resin	100 parts
Plasticizer	54 parts
Cadmium-Barium Stabilizer	1.5 parts

MONOPLEX *and* PARAPLEX *are trade-marks, Reg. U. S. Pat. Off. and in principal foreign countries.*

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2 — V — 4

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BARIUM-CADMIUM
128 — V — 5

Leading combination of coprecipitated laurates for outstanding performance, where lubricating advantages are required. Generally 30% more effective than common barium-cadmium laurates.

Stabilizing Systems developed for Harshaw Customers, for special processing and finished product properties, may contain one of the following eleven stabilizers.

ZINC 9-V-1: Organic liquid complex containing no disadvantageous soapy component, used in selected formulations.
CADMIUM 22-V-1: For rigids, clear to translucent.
CADMIUM 24-V-1: Organic liquid complex for highest attainable clarity, used principally with dispersion resins.
CADMIUM 2-V-8: Selected laurate, used principally with low fusing resins.
BA-CD 12-V-5: Coprecipitated laurate.
BA-CD 12-V-31: Liquid combination, for low fusing resins.
ORGANIC 7-V-1: Epoxy assistant, modification of 7-V-2.
BARIUM 1-V-3: Dispersible stearate, to contribute lubricity with barium effects.
BARIUM 1-V-6: For asbestos filled tile.
BARIUM 1-V-7: Liquid, for modified plastisols and organosols.
CALCIUM 5-V-1: Dispersible stearate, to contribute lubricity with calcium effects.
CALCIUM 5-V-2: Low melting stearate, to reduce internal friction effects.

Best effects are attained for particular requirements by combining 2-V-4 or 128-V-5 in a stabilizing system with one or more of the following three stabilizers.

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ORGANIC
7-V-2

Epoxy assistant, highly effective HCl-scrubbing agent, undiluted. Will extend stability for longer processing periods.

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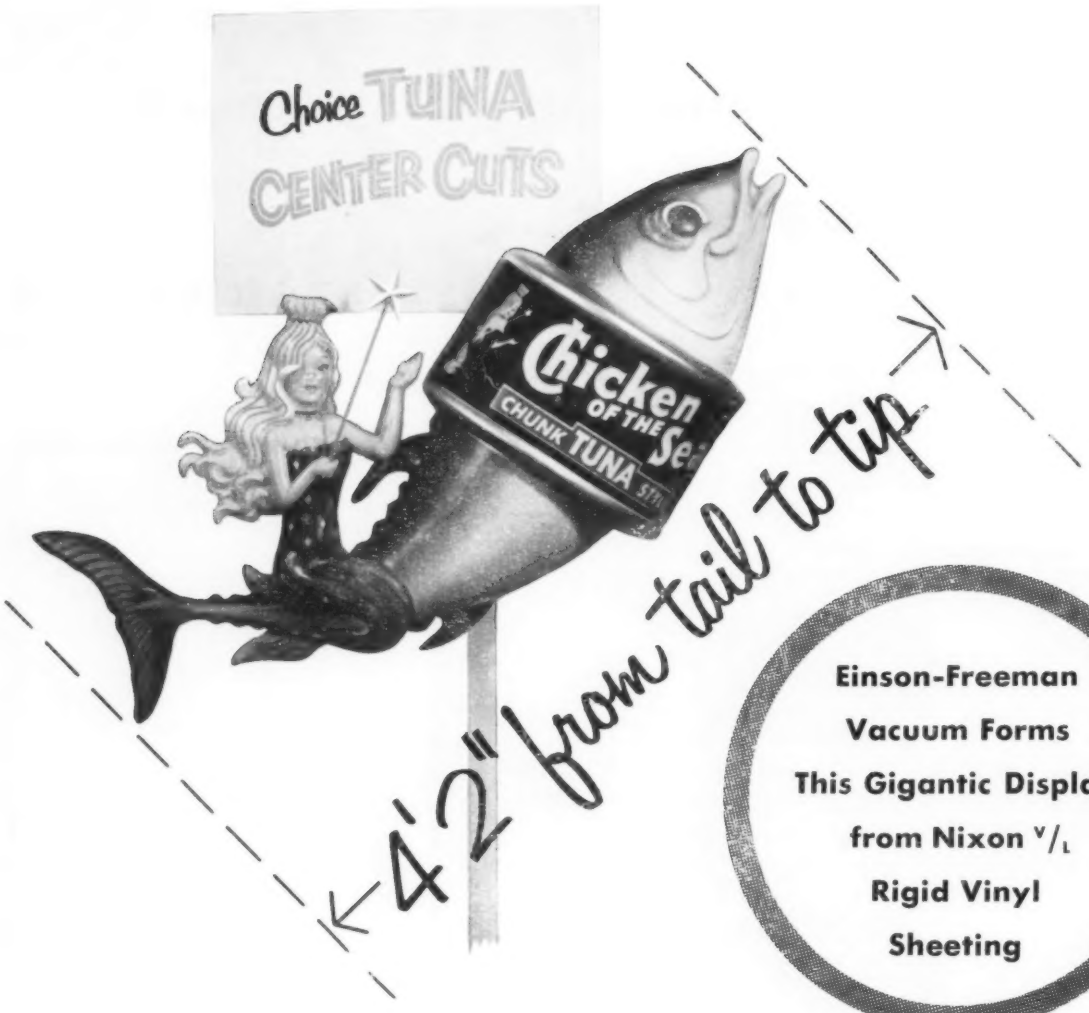
8-V-1

Chelating agent, more than two times as effective as common organic phosphites. Inactivates harmful by-products to boost stability. Contributes to top clarity.

CADMIUM
28-V-2

For rigids, opaque to translucent. Stabilizes unplasticized resin efficiently and economically, with minimum effect on physical properties of product.

THE HARSHAW CHEMICAL CO.
CLEVELAND 6, OHIO



Einson-Freeman Vacuum Forms This Gigantic Display from Nixon V/L Rigid Vinyl Sheeting

WITH brand-versus-brand competition in supermarkets stronger than ever, Van Camp Seafood Co. commissioned Einson-Freeman, Long Island City, N. Y., to design a really unusual display to tie in their national "Chicken of the Sea" tuna promotion at the point of sale. Einson-Freeman devised this enormous, colorful flasher sign, which towers over ten feet high and easily dominates any store where it is displayed.

Each unit is vacuum formed from Nixon V/L Rigid Vinyl Sheeting that is pre-lithographed in beautiful color. Why was Nixon V/L selected as the ideal material? Among the numerous reasons, all of them important, are the ease with which it can be vacuum formed or deep drawn, the fine way it accepts multi-color printing, its ability to withstand the heat generated by the flasher light, and its impact resistance should the unit accidentally be knocked over.

Don't these outstanding characteristics suggest an application where you could profitably incorporate vacuum formed Nixon V/L Rigid Vinyl in your own operation? Perhaps as a display . . . as a container . . . as a housing . . . or as a component. Production by vacuum forming is exceedingly inexpensive, even where only a few units are involved.

Our nearest sales office will be glad to provide you with information on using Nixon V/L Rigid Vinyl Sheeting and on other vacuum formable Nixon Plastics.

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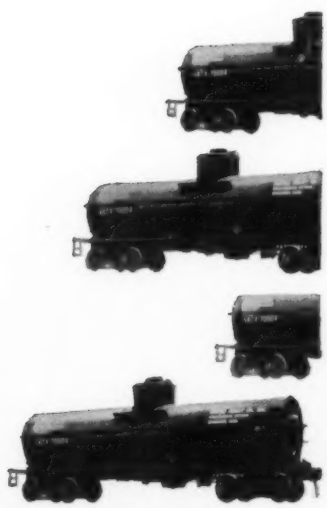

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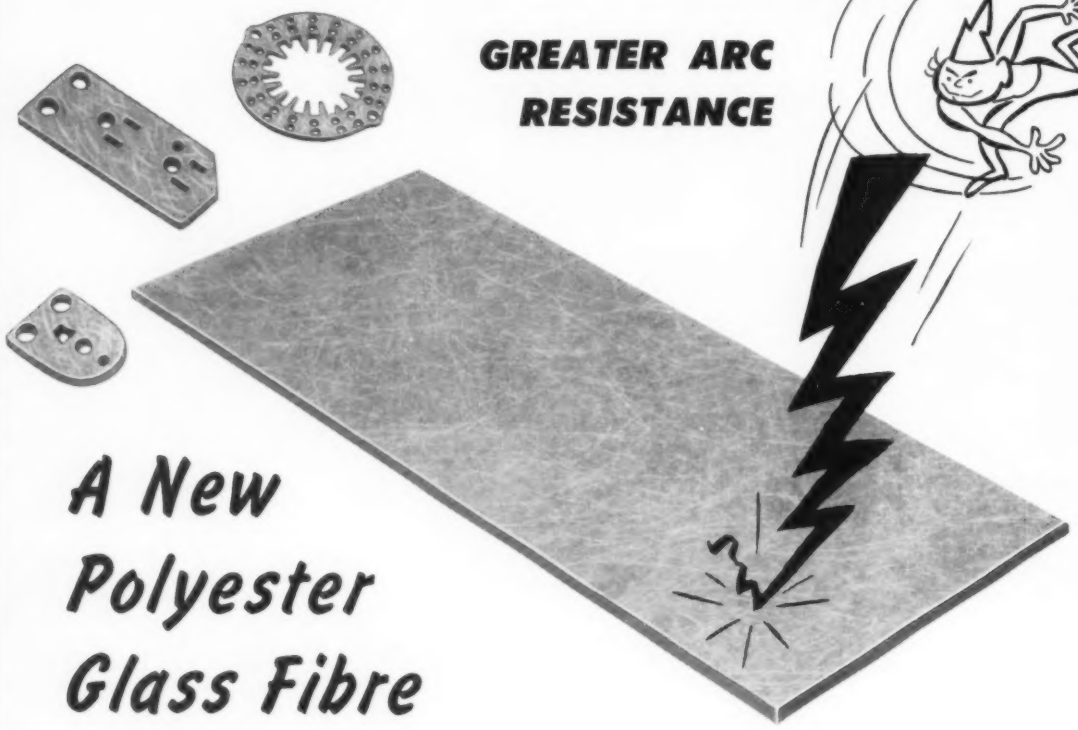
A PIONEER IN PLASTICS FOR OVER THIRTY YEARS



A New Polyester Glass Fibre Insulating Sheet – INSUROK® XT-200

• If you are looking for an insulating laminate that combines excellent electrical properties with good structural strength, consider this new Richardson laminate. INSUROK XT-200 is an excellent material for pole insulators, cable holders and switches, where arc resistance is important, as well as for motor-generators, transformers, switchgear, electroplating equipment, and various kinds of electrical and electronic heating devices. Moreover, INSUROK XT-200 has very satisfactory fabricating qualities. It is available in sheets 34" x 34", in thicknesses of 1/16", 1/8", and 1/4". The Richardson Company will be glad to supply further information and samples.

Send for Data Sheet XT-200

- GOOD ELECTRICAL PROPERTIES
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- PUNCHES COLD TO INTRICATE SHAPES

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You can now make low-density polyvinyl chloride sponge at atmospheric pressure with DU PONT BL-353

This new Du Pont chemical blowing agent has the following advantages:

REQUIRES no special equipment

PRODUCES consistent results in a simple operation.

OFFERS wide latitude in formulating plastisols.

PERMITS use of low-cost extenders and fillers.

PERMITS a wide range of densities, down to less than 6 lbs./cu. ft.

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PRODUCES excellent cellular uniformity for a wide variety of cell sizes.

HAS excellent expansion efficiency.

LIBERATES large volume of nitrogen at a uniform rate.

IMPARTS no odor or color.

PRODUCES snow-white sponge.

PERMITS production of sponge in a variety of colors and shades.

PRODUCES a predominance of interconnected cells.

MAY be used in slush-molding operations.

SEND FOR FREE BULLETIN. Our new bulletin explains how BL-353 is used to make high-quality sponge that may be just what you need for your application. If you would like a free sample for experimental work, just write: E. I. du Pont de Nemours & Co. (Inc.), Chemical Sales, Explosives Department, Room 11502-N, Wilmington 98, Delaware.

Du Pont BL-353

Product of Du Pont Explosives Research

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Fully Automatic Molding

FOR GREATER ECONOMY . . . SPEED . . . SAFETY

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The Standard Pierwood Automolder offers positive mold protection against closing on unejected parts. One 15 hp. motor operates three machines with Vickers pump and control valves. Complete, positive and simple mechanical controls. No timers necessary.

- 1½ oz. Capacity
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- 6¾ Max. stroke

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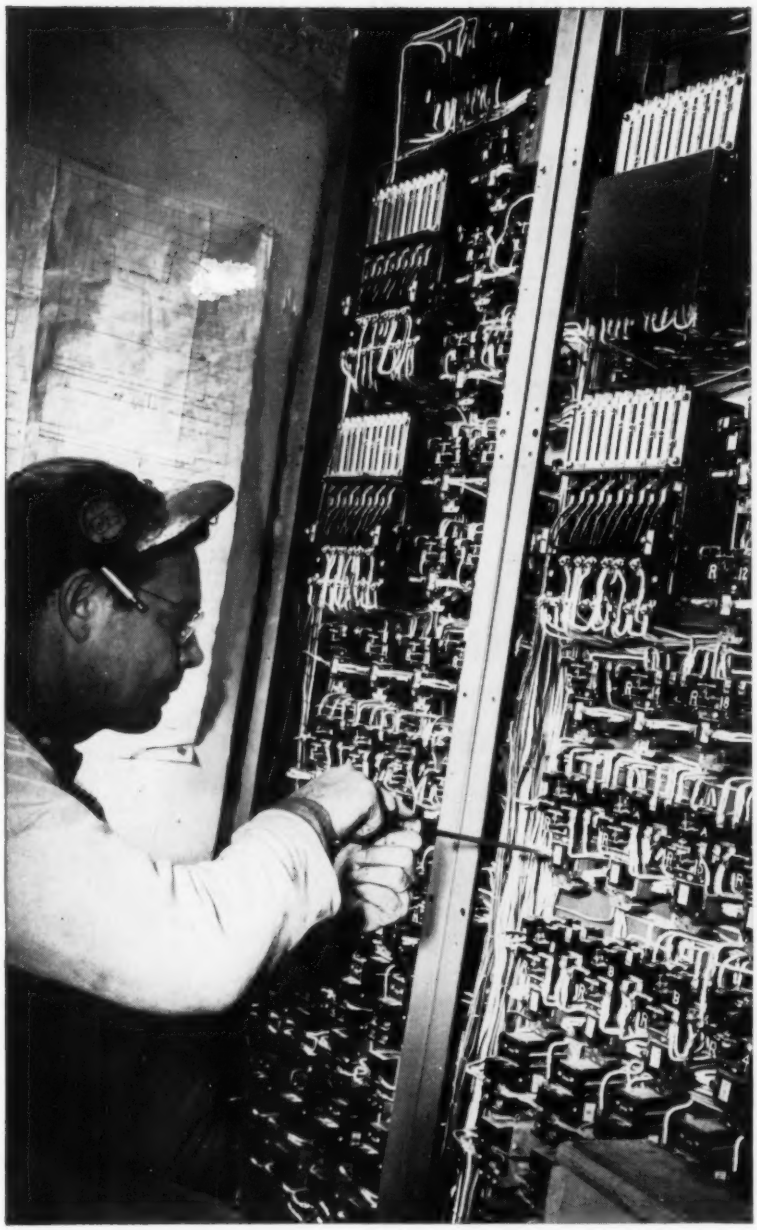

HERCOFLEX 150 IS MADE FOR LIVE WIRES

Complicated electrical installations, like this "switch board" which operates the centrifuge at Hercules' plant in Mansfield, Massachusetts, give longer, more dependable service when vinyl wire insulation is made with Hercoflex 150.

Hercoflex 150, one of a number of Hercules vinyl plasticizers, retains its high dielectric strength even after prolonged exposure to high temperature. And the broad range of useful temperatures observed in vinyls plasticized with Hercoflex 150 is making it increasingly popular not only for extruded wire coatings but also for cable-jacket stock.

Compatible with most primary and secondary vinyl modifiers, Hercoflex 150 can be processed quickly and economically with the various vinyl chloride polymers and copolymers. It has unusually low volatility and is always uniform in quality, properties, and performance.

Hercoflex 150 is readily available. For additional technical data, write Hercules.

HERCOFLEX® VINYL PLASTICIZERS

- **150** (di-N-octyl, decyl phthalate)
- **200** (di-iso-octyl phthalate)
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SH54-2

Mr. Paul Herr, director of Air Conditioning Division, Daffin Manufacturing Co., Lancaster, Pa., tells why they use Aico Molded Plastics:

. . . being determined to produce a really efficient home humidifier, we realized the importance of precision craftsmanship in all its parts. When we were faced with the need for extreme precision in the plastic pump impeller we planned to use, a friend suggested we turn the job over to American Insulator. Ever since, Aico has been supplying us production run parts held to a .005 tolerance. A remarkable example of precision plastics molding!"

New **Daffin** home humidifier

keeps profits from drying up

by replacing 8 metal parts

with molded plastics impeller

THERE are many ways plastics can reduce manufacturing costs. The Daffin impeller is a good example. Instead of buying numerous separate parts, many of them having to be machined, Daffin Manufacturing simplified purchasing, eliminated many assembly operations . . . and obtained more efficient operation by using one plastic molding. And, because Aico is so completely equipped as a molder, Daffin was able to obtain the other important parts for their new humidifier from *one* source and further reduce costs. If you have a similar need for plastics, get in touch with Aico today

Let Aico help you use plastics

We have prepared several useful tools to help you get the full production and cost saving benefits of molded plastics. Just check the coupon for the ones you want. There's no obligation.

Please send me

____**The Aico Plastics Applicator** (gives complete properties, molding methods, etc.)

____**"What you should know about Reinforced Plastics"** (applications, properties and molding)

____**Aico Plant Facilities Booklet** (what a modern molder needs to produce precision plastic moldings)

*Name*_____ *Position*_____

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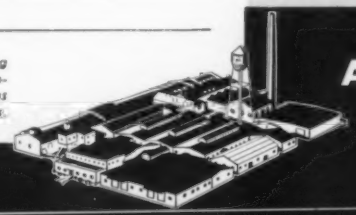
*Address*_____

***Complete plastics molding service** including engineering counsel, mold making, compression, injection and cold molding as well as the molding of reinforced plastics.*



AMERICAN INSULATOR

Since 1916

NEW FREEDOM, PA.

MODERN PLASTICS
VOLUME 32 NUMBER 3 NOVEMBER 1954

Millions for Models

A basic human creative need makes an inexhaustible market for millions of pounds of plastics in millions of scale model hobby kits. From design to molds to promotion, here is the story of how that market was developed

A COMBINATION of designing ingenuity, engineering integrity, merchandising vigor, and clever promotion has been responsible for fabulous success in the use of plastics by Revell, Inc., Venice, Calif.

The company's products—hobby kits for making miniature models—could not have been made out of anything but plastics, because in no other material could authenticity of minute detail have been obtained, and few other materials can be satisfactorily bonded with simple and easily obtainable cements.

The whole proposition was soundly based on the economics and psychology of our times—times in which increased leisure, physical and emotional strain, and automation both in the home and in the factory have made creative hobbies so necessary to so many people. The desire to build something beautiful and ornamental and durable with one's own hands is inherent in all mankind, which is why model building has always been a popular hobby. But many people have not the time, the patience, or the manual dexterity to build, from scratch, models of which they could be proud.

It was in direct service to this need that Lewis H. Glaser directed the development of Revell, Inc. and its products. At the start, only three years ago, the company produced a fully assembled acetate model of Jack Benny's famous Maxwell and moved into the production of other ancient vehicles in complete model form. Original distribution was largely through toy outlets, but soon dealers and customers began to request unassembled models of everything from ancient sailing ships to the latest jet planes. Thus the company found itself with a wealth of ideas for new items to add to the line, plus a design, engineering, and

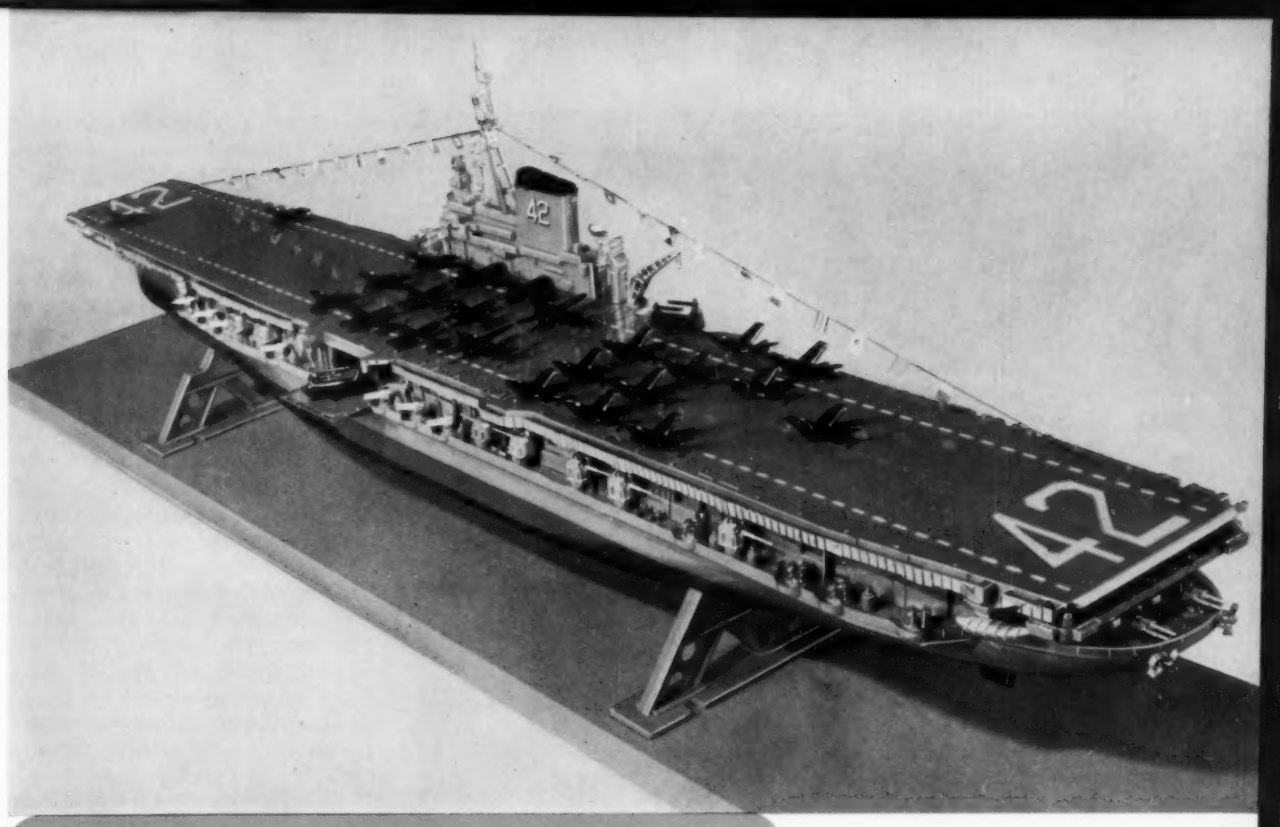
Official United States Navy Photograph

The Aircraft Carrier F.D.R.

merchandising problem of huge proportions. It appeared, and has since been proved, that literally everyone is a potential model maker. It appeared also that there are certain classifications of model makers' interests; some people like ships, some automobiles, some airplanes, some fire engines, some antique reproductions, some models of things not yet on the market. It also was obvious to Revell's management that the meticulous detail and dimensional scale exhibited in its first model productions was to be expected of it in all future products.

How well the company met the challenge is shown by the fact that in 1952 it used 400,000 lb. of plastics, divided about evenly between cellulose acetate and styrene, and in 1954 will use greatly in excess of 3,000,000 lb. of molding material, of which approximately 500,000 lb. will be acetate and the balance styrene and

Molds for the F.D.R.



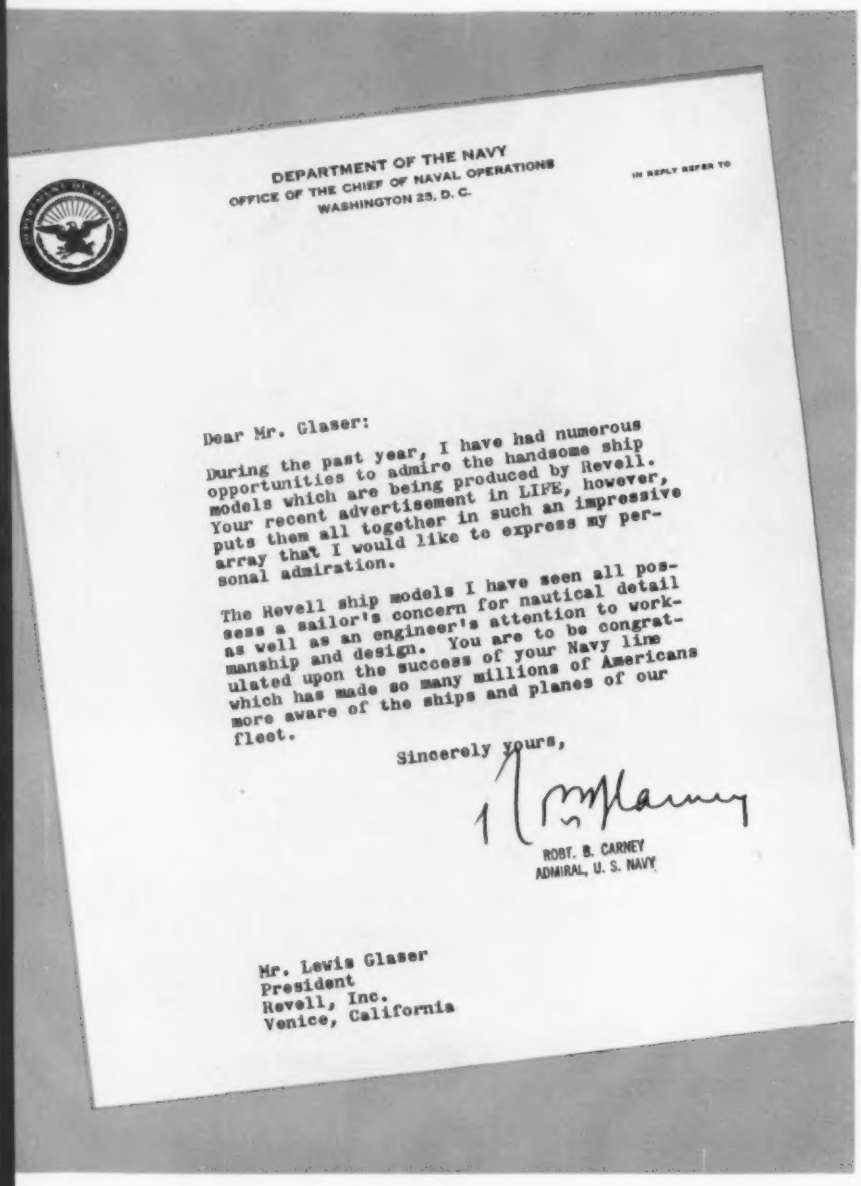
Plastic Scale Model F. D. R.

styrene alloy or high impact material.

Today's Revell line embraces two models of ancient automobiles in "grand" size, 20 ancient cars in miniature model form, three modern miniatures (a Jaguar, an MG, and a "hot-rod"), three miniature scale models of our most prominent jet fighters, four strategic bombers, eight modern naval vessels, a line of ten fine ancient sailing ships, and a new museum line of famous horse-drawn vehicles. In addition, a separate division of the company in New Jersey produces six old-time fire fighter models. To each division of this imposing list, new models are constantly being added. The company now has arrived at the point where market surveys are made to help decide which model to add first.

The design ingenuity and engineering integrity mentioned above is illustrated in each and every product

Components for the F. D. R.



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D. C.

IN REPLY REFER TO

Dear Mr. Glaser:

During the past year, I have had numerous opportunities to admire the handsome ship models which are being produced by Revell. Your recent advertisement in LIFE, however, puts them all together in such an impressive array that I would like to express my personal admiration.

The Revell ship models I have seen all possess a sailor's concern for nautical detail as well as an engineer's attention to workmanship and design. You are to be congratulated upon the success of your Navy line which has made so many millions of Americans more aware of the ships and planes of our fleet.

Sincerely yours,

ROBT. B. CARNEY
ADMIRAL, U. S. NAVY

Mr. Lewis Glaser
President
Revell, Inc.
Venice, California

offered. In the first place, no expense or effort is spared to make the reproductions exact in scale and detail. Each project involves thousands of hours of research and study in libraries, museums (in the case of antique models), in the engineering and design facilities of the U.S. Navy, of automobile manufacturers, and aircraft companies. In the second place, the translation of the first hand-made model into the "do-it-yourself" engineering formula with bosses, nubs, and other assembly devices and indicators, is an art in itself—because Revell has found that the sub-miniature components are best degated from the sprues just as the shots come from the injection machines, and packed right at the machines.

Perhaps the complexity of the whole operation may best be illustrated by taking a single hobby kit model and showing how it was developed. Take the case of the aircraft carrier *Franklin D. Roosevelt* (CVB) "Midway class."

The company had previously enjoyed tremendous success with its famed "Big Mo" and in the first year sold well over a million models of the *Missouri* at $1.98 retail. In the modern ship line that unit was quickly followed by a PT boat, a destroyer, a cruiser, a Chris-Craft cabin cruiser, and the then unseen atomic submarine, the U.S.S. *Nautilus*. When the decision was made to embark on the most fabulous reproduction of all, the *Franklin D. Roosevelt* carrier, the design and engineering teams had already much hard experience behind them—but much hard work ahead.

According to Jane's "Fighting

Starboard view of model aircraft carrier *Franklin D. Roosevelt* shows minute detail in model. Other ships in model "fleet" include. . .

Ships," the *Franklin D. Roosevelt* was built by the New York Navy Yard, was laid down on December 1, 1943, launched on April 9, 1945 and completed on October 27 of the same year. The original has a displacement of 45,000 tons, is 968 ft. long, has a maximum width of 136 ft., cost $90,000,000, and has a war-time complement consisting of approximately 3000 officers and men.

Cooperation from the Navy

Original discussion of Revell's model project of this carrier began in the Winter of 1952. The U.S. Navy Bureau of Ships supplied a complete set of detailed drawings showing external views, and for additional details Navy libraries and clipping files were sources. By March 1953 research at model level was begun and plans went into Revell's model shop in July. The final hand-made models, constructed of the exact same component parts as were to comprise the finished kit, were approved in February, 1954. Over 1500 man-hours had already been devoted to research and at least a like amount to model making.

Once the model was approved, molds were cast which were then used for cutting steel cavities. To assure proper fit and alignment of all plastics parts, tolerances of 0.002 in. were normally maintained on all sections, but since the mold itself had to be built so that parts could be produced without flash, tolerances as low as 0.0005 in., were required where critical side shut-offs were necessary for proper molding.

The first samples to be tested from the molds were run off in June of 1954. Over 11,000 man-hours had been devoted to mold making.

The hobby kit of the F.D.R. has 84 plastics components to assemble in 39 component classifications—before adding painted decorations, decals, flags, etc.

Meanwhile, packaging had to be prepared, assembly instruction sheets printed, flag sheets and decal strips readied, and the inspection and packaging lines set up. But, in this business, perfection and production of a product is only the beginning. Promotion and distribution are quite as important.

Promotional Efforts

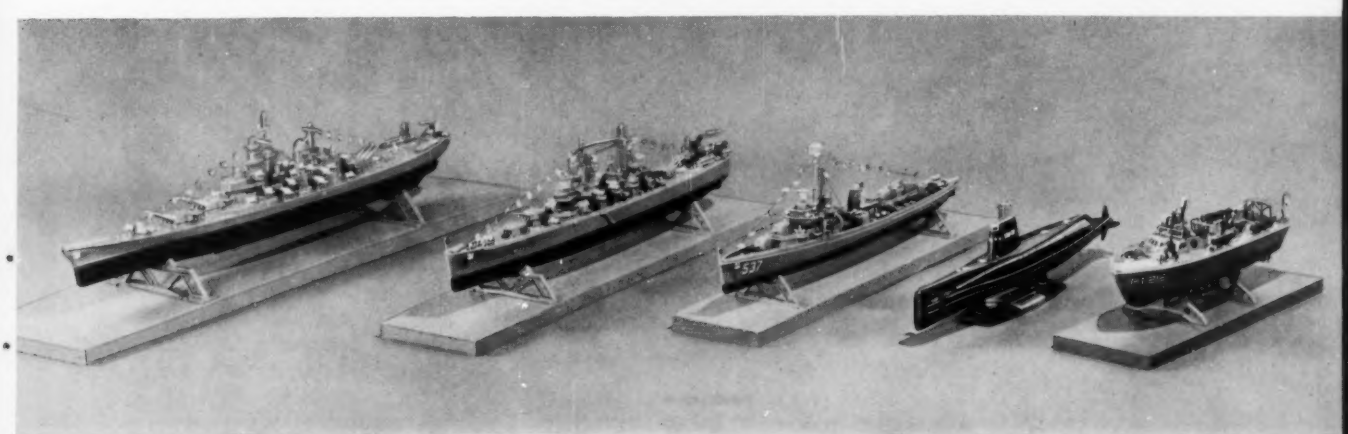
First step in the promotion of the carrier model kit was the presentation of the original finished model to James Roosevelt, son of the late President Franklin Delano Roosevelt, to be placed on permanent exhibit in the Roosevelt museum at Hyde Park, New York. Now, similar presentations are being made to key individuals such as high naval authorities, to museums, and to other permanent exhibits. Some 5000 handmade, decorated models, each in its own transparent display case, are being distributed through key retail stores throughout the country for display purposes. A wide barrage of publicity is already under way to appear in leading magazines and newspapers, to be sent over wire services, and to be featured in television appearances, newsreel pictures, etc. An assortment of dealer helps such as window display material, counter strips, direct mail folders, counter and floor display units are used to bring point-of-sale results from Revell's national consumer advertising. Between now and Christmas the new model hobby kit carrier will be on sale in over 20,000 retail outlets from coast-to-coast.

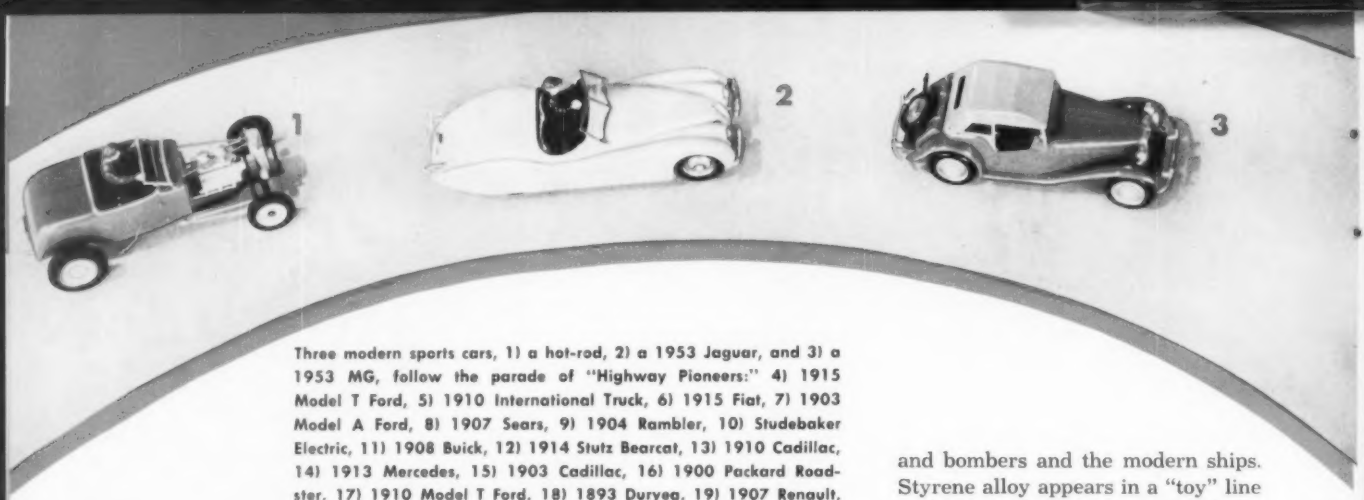
At the age of 36, Louis H. Glaser, founder and president of Revell, Inc., is an outstanding young industrialist and a leader in the proprietary plastics field. Starting out in 1934 as a radio repair man and technician, he opened his own appliance store in 1938, and in 1942 went into the manufacture of plastics toys and hobby kits. The present line of do-it-yourself scale model kits was begun in 1951. This year it is expected to absorb more than 3,000,000 lb. of plastics.

As with the new aircraft carrier, so with every other item in the tremendous line: it is a combination of talent and effort that counts. It is planning, it is timing, it is meticulous attention to detail. A letter from Admiral Robert B. Carney, chief of naval operations, reproduced herewith, speaks worlds for the results of Revell's integrity.

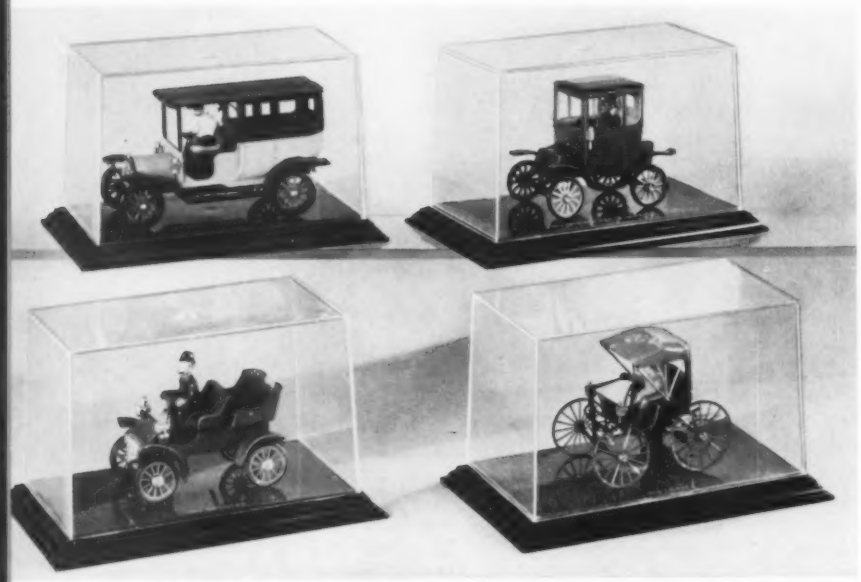
The small, delicate, and more intricate hobby kits such as the "Highway Pioneer" model ancient automobiles and the "Miniature Masterpieces" collection of famous horse-drawn coaches, require the use of cellulose acetate molding material. Polystyrene is used for the larger model kits such as the jet fighters

. . . the battleship *Missouri*, a heavy cruiser of the Baltimore class, a destroyer, the atomic-powered submarine U.S.S. *Nautilus*, and a PT boat

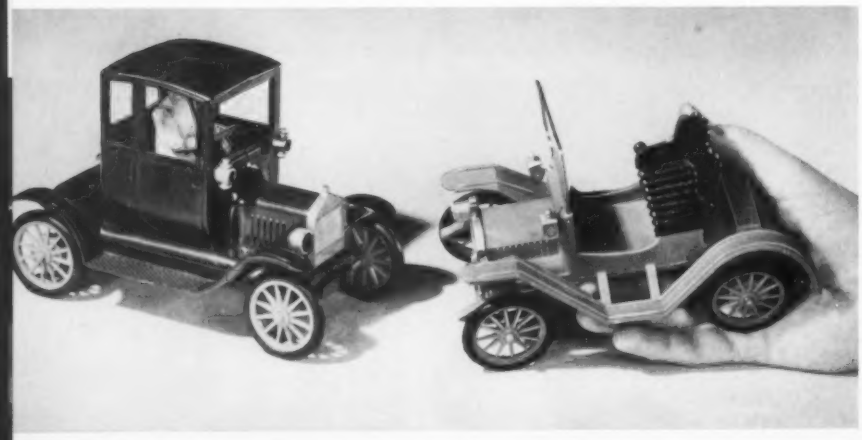




Three modern sports cars, 1) a hot-rod, 2) a 1953 Jaguar, and 3) a 1953 MG, follow the parade of "Highway Pioneers:" 4) 1915 Model T Ford, 5) 1910 International Truck, 6) 1915 Fiat, 7) 1903 Model A Ford, 8) 1907 Sears, 9) 1904 Rambler, 10) Studebaker Electric, 11) 1908 Buick, 12) 1914 Stutz Bearcat, 13) 1910 Cadillac, 14) 1913 Mercedes, 15) 1903 Cadillac, 16) 1900 Packard Roadster, 17) 1910 Model T Ford, 18) 1893 Duryea, 19) 1907 Renault, 20) Pierce Arrow, 21) 1911 Rolls Royce, 22) 1909 Stanley Steamer, 23) 1904 Oldsmobile—each a triumph in accurate reproduction



For dealer display purposes, "Highway Pioneers" are housed in cases made up of black styrene bases and transparent styrene covers; name of each car is engraved on base



Two models of the car line are scaled ¾ in./ft.: the 1913 Maxwell (on which the business was founded) and the 1917 Ford Coupe; "Highway Pioneers" are scaled ⅜ in./foot

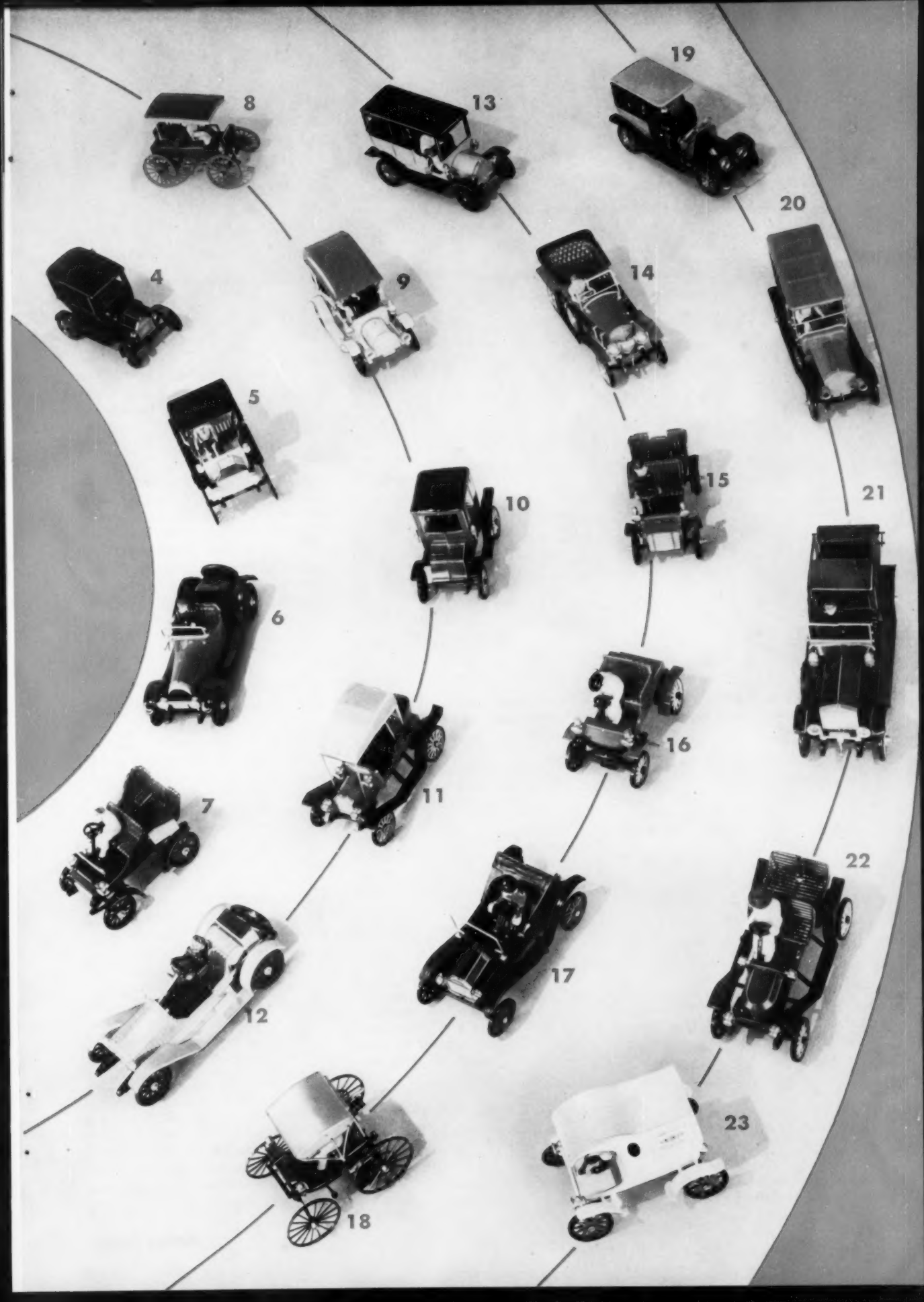
and bombers and the modern ships. Styrene alloy appears in a "toy" line such as truck play sets and a bulldozer.

Plastics Poundage

The quantities of plastics used in the run of an individual model are considerable. To date the battleship *Missouri* model has used up over ½ million lb. of styrene. The *Missouri* kit weighs 185 g. and a family mold produces 120 per hour. The average ancient car model requires 100,000 lb. of acetate; the car weighs approximately 35 g. and the cycle is set at 170 per hour.

Intricate is the word for this kind of mold making. Five different kinds of molds are employed, the choice of type depending on the intricacies of the model, the projected run, and the time required for release of product. In some cases beryllium copper molds are cast from steel hobs; in other cases, beryllium copper hobs will be cast from handmade models and these hobs used for the casting of beryllium copper cavities. In still other cases steel cavities are produced from steel hobs, steel cavities are machined from block, or steel cavities and pantograph cut from large-scale master models of the simpler units. The company has large mold shop facilities of its own but finds it necessary to use as many as six different outside mold-making shops to help produce the many new molds which are constantly coming into production.

Promotion-wise, except for three or four items definitely in the toy category, the Revell lines have found their biggest appeal to "boys" of all ages from nine to ninety, but by far the biggest and most constant sale is to adults. Indeed, one of the most outstanding and resultful advertisements on the company's part was a full-page ad in *Life* Magazine this year promoting the use of Revell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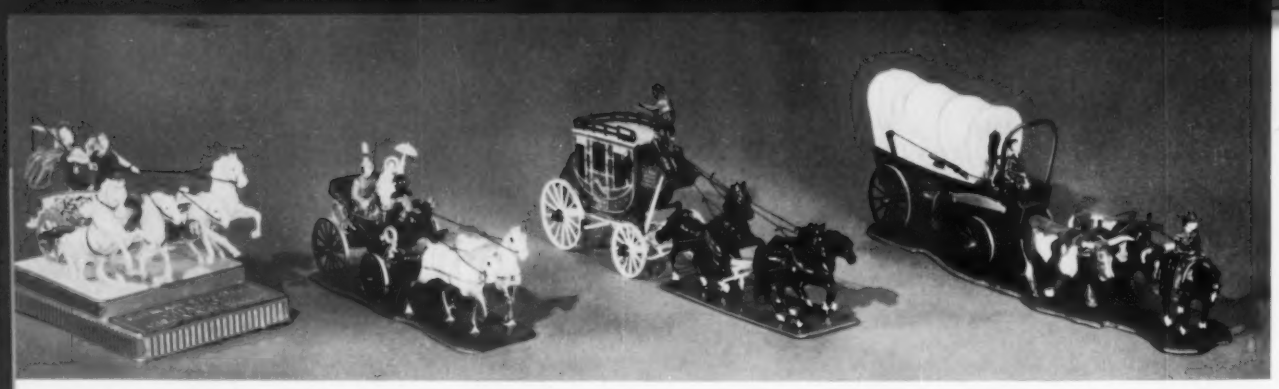
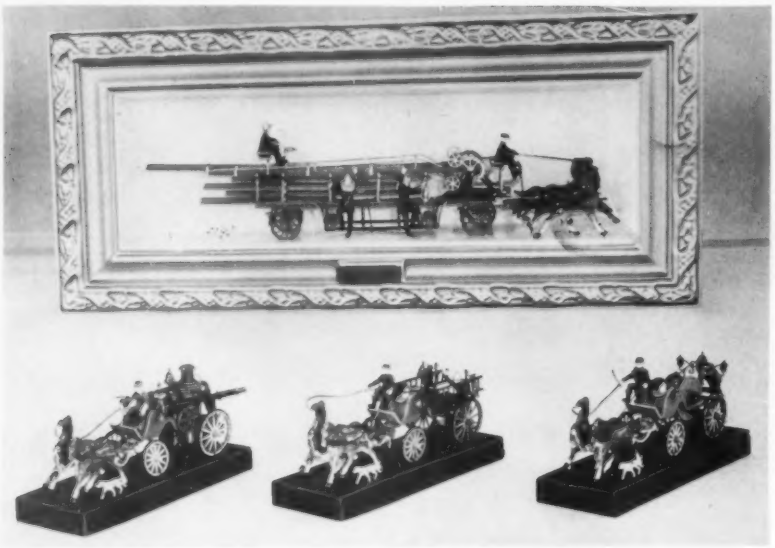
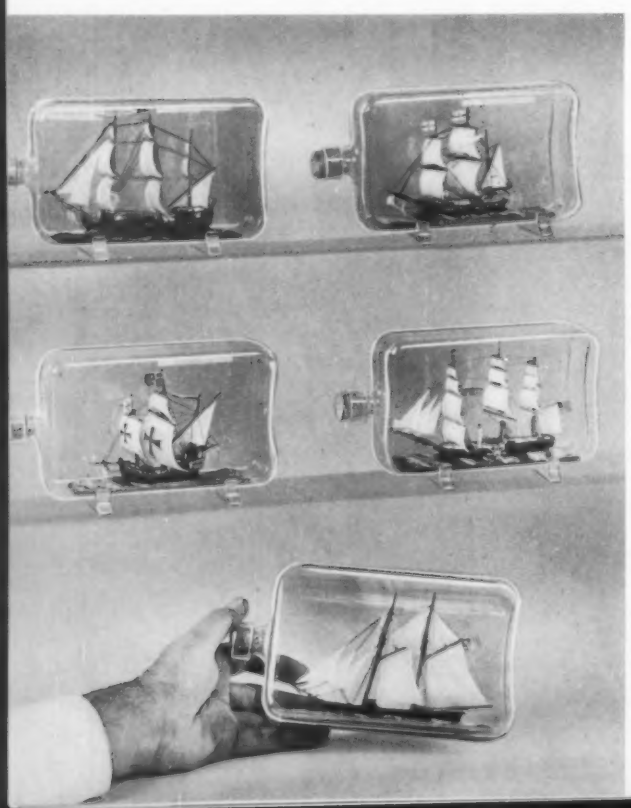


"Miniature Masterpieces" include Ben Hur chariot, Lafayette carriage, State Coach of England, and covered wagon—all easily assembled by hobbyist



Old-time fire fighter models include a steamer, a chemical spray and ladder, a hose reel, a hook and ladder, a water tower, and (top) an aerial ladder in vacuum-formed frame



Included in a line of 10 fine sailing ships distributed in hobby kit form, complete with molded "bottles," are the *Santa Maria*, the *Mayflower*, the U. S. frigate *Constitution*, and the *Flying Cloud*—all simply made

model kits for Father's Day. The company is constantly inundated with letters from customers and dealers requesting early information on proposed new models or suggesting models which might be added to the line.

Limitless Future

Since the whole proposition is so absolutely fundamental to the needs of our times, the future is clearly limitless, but the work to be done is onerous and complicated. All means of transportation in all sections of the world from the dawn of time to the present and on into the future are fitting subjects for treatment by Revell. Between the fulcrum and the wheel and a rocket to Mars lie uncounted millions of opportunities.

By the same token the distribution and promotional pattern of the company is being continually broadened. While original distribution was concentrated in the toy and hobby outlets, the kits today are available not only in those two basic fields but in drug, variety, auto accessory, sporting goods, cycle, stationery, and numerous periphery markets.

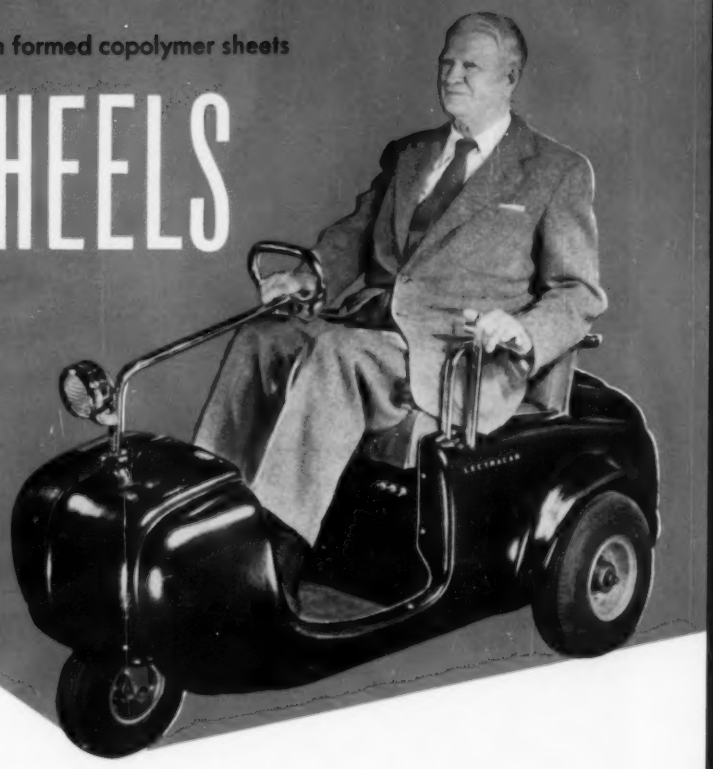
Specialized model hobby kits have been developed by the company for the premium field, and there is a great expansion in this direction. It is logical to expect that manufacturing companies will recognize that in plastics model kits of this type—authentic, realistic and exactly scaled—there lies an opportunity to bring into American homes replicas of their famed and treasured trademarks.

• • •

Credits—A list of mold makers, equipment suppliers, and materials suppliers connected with the above-described model kits appears on page 199 of this issue.

In a new electrically powered wheelchair, vacuum formed copolymer sheets form a

SHELL on WHEELS



Use of vacuum formed copolymer sheet for body panels of electrically operated wheelchair makes possible a lightweight yet sturdy vehicle that is easily maneuvered

VACUUM formed body panels of 0.065-in. copolymer sheet, shaped over fibrous glass-polyester male molds, contribute to the light weight, attractive design, and sturdiness of the Lectracar, an electrically powered wheelchair recently introduced by Versal, Inc., South Bend, Ind., and sold through Sears, Roebuck & Co. Use of the thermoplastic sheet stock for the body panels of this specialized vehicle suggests the adaptability of suitable formed plastic sheets for such parallel applications as amusement park ride bodies and enclosures for lift trucks and other types of industrial vehicles.

The Lectracar, incorporating a three-wheel design for maximum maneuverability both indoors and out, can turn in its own length, pass through a 30-in. opening, and climb grades as steep as 15 percent.

Over-65 Market

Officials of Sears, Roebuck & Co. point out that the Lectracar was designed primarily for the over-65 group, which has quadrupled in number since 1900 and now totals some 13 million men and women. The light weight of the non-denting plastics body panels of the vehicle, used in conjunction with a frame of bronze-welded tubular steel, helps to insure a low center of gravity which keeps the chair stable. The body easily resists the bumps encountered in normal service, and its inherent color eliminates the need for applying a surface finish which might chip or deteriorate in use.

In the initial design of the Lectracar, special consideration was directed to attractive appearance. "To obtain beauty in design having customer appeal," says Carl W. Johnson of Versal, "we found it necessary to use compound curved surfaces, and as the market for such a vehicle was limited, only a modest investment for tools could be allowed. Due to the area of the body panels, dies for metal fabrication were automatically eliminated, resulting in our use of plastics. Our analysis of material and labor involved indicated thermoplastics as best suited to our purpose."

Design Development

First step in the creation of the Lectracar body was the development of the design on paper, through perspective drawings which were then translated into scale drawings. Next, a wooden buck, or skeleton frame, was made to support the modeling clay. Final styling then followed on a full size clay model, with careful consideration given to the draw depths involved to avoid undue gage reduction of the sheet material during the forming process.

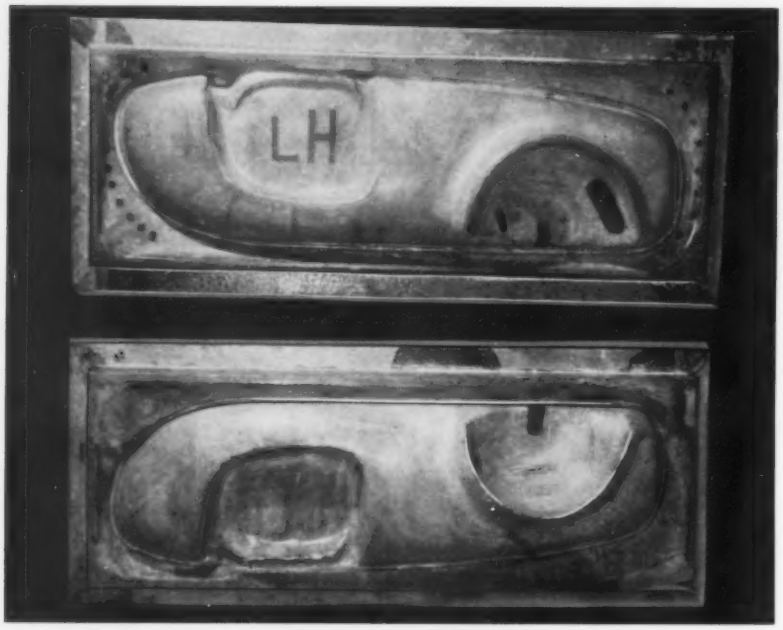
Body paneling was divided into four sections, including right and left side panels, cowl panel, and rear deck panel. The two latter components overlap the side panels, producing an attractively finished assembly in the completed vehicle.

Following completion of the full size clay model, plaster casts were taken directly from the model. From these female casts, male plugs were made and used to form test panels. These panels were attached to the chassis by means of self tapping screws and finish washers. Tests for vibration, sound deadening characteristics, resistance to denting, and removal for motor and other servicing at this point confirmed the suitability of the selected copolymer sheet material for the body panels.

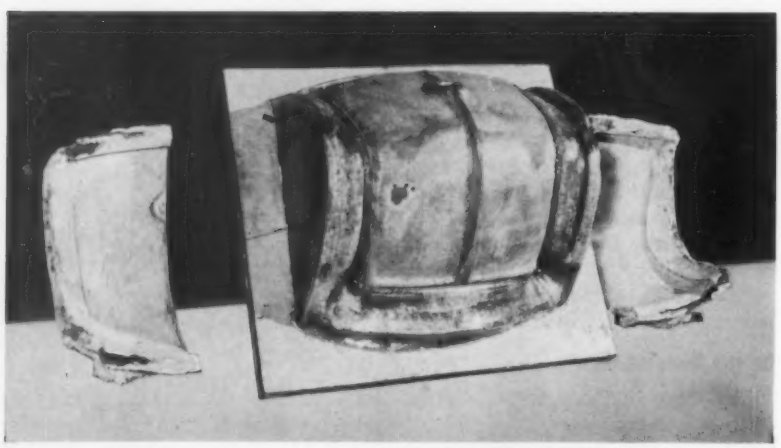
The next step involved making female plaster casts from the checking male plaster forms. These casts

Photos courtesy Versal, Inc.

Final styling of wheelchair body is done on full-size clay model. Careful consideration is given to draw depths in order to avoid undue gage reductions during forming



Reinforced plastics production molds for side panels of wheelchair body are built up to an average thickness of about ⅛ in.; panels are formed without use of press



Polyester-impregnated fibrous glass male mold for cowl portion of wheelchair body was formed in female plaster cast, shown split to right and left of mold

were then cleaned up and sealed with lacquer and male forms were built in the female plasters, using fibrous glass in combination with polyester resin. The reinforced plastics forms, built up to an average thickness of ⅛ in., reproduce the desired body panel surfaces plus necessary conformations for gage control. Mounted on ¾-in. plywood frames, the reinforced plastics male forms are taped to the vacuum table when in use.

Forming Operation

From the production standpoint, an interesting feature of the Lectracar body panels is the fact that they are formed without the use of a press. According to Dale L. Cosper of Versal, a press could not be used economically in this particular case because of the sheet sizes involved. The company slits a 54- by 72-in. sheet of copolymer stock into two equal pieces 27 by 72 in. in size. The narrow width of the sheets precludes the use of a draw ring, because the ring would have to be placed so close to the edges that draw troubles would appear.

In forming the panels, Versal substitutes man power for the draw ring and press. After being softened by convection heating, the sheets are held manually over the form until a vacuum is established, then the material is allowed to slip where required to prevent gage reduction. Even with this rather elementary process, the company is able to turn out ten side panels per hour.

Following the forming operation, the plastics panels are trimmed on a 14-in. Delta wood band saw with skip tooth blades, run at regular wood working speed. For production components, only plastic material having a smooth black finish has been used to date, although experimental panels have also been formed using other colors.

The Lectracar chassis to which the four body sections are mounted is of all steel tubing, welded into a rigid integral frame. The vehicle does not have a separate suspension system, depending entirely for cushioning on the three low-pressure tires. Edges of the plastic material around the door opening are protected by an extruded aluminum section which is preformed and then crimped in place. The seat of the vehicle consists of red Naugahyde

vinyl sheeting over Koylon foam rubber, a combination affording comfort and excellent service.

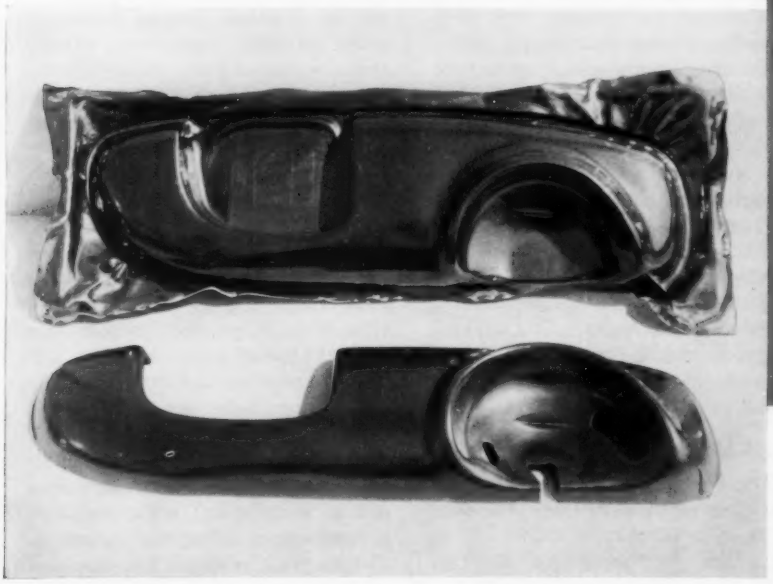
In the opinion of Mr. Johnson, Versal's experience with the Lectracar body indicates that thermoplastic sheet, used in combination with reinforced plastic tooling, "provides an excellent medium for short run or low production of complicated shapes to be obtained in no other way where tool cost is a factor."

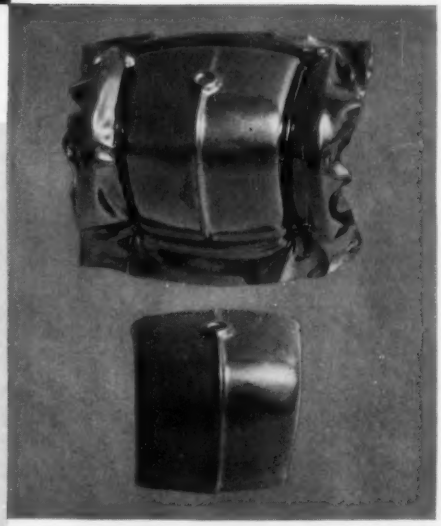
CREDITS: Body panels formed of Royalite copolymer sheet, supplied by U. S. Rubber Co. Reinforced plastics tools made with Vibrin 114 polyester resin.

Three-quarter rear view of completed wheelchair. The seat of the vehicle consists of foam rubber covered with vinyl sheeting

The four copolymer sheet body sections are mounted on chassis consisting of steel tubing welded into an integral frame assembly

Untrimmed and trimmed vacuum formed left-hand side panel. Trimming is done on a 14-in. Delta wood band saw with skip tooth blades, run at wood working speeds





Cowl panels, vacuum formed on reinforced plastics mold shown on facing page, before and after trimming operation

Four reinforced plastics panels can be set out to cover an area 8 ft. wide and almost 28 ft. long, without any noticeable lapping over of joints

Super Siding

Photos courtesy Chemold Co.

King-size panels were used to sheath the building in the background

A NEW design in press-molded reinforced plastics panels has recently been introduced to the market under the name Chem-O-Glas and is receiving much attention from architects, designers, and construction engineers.

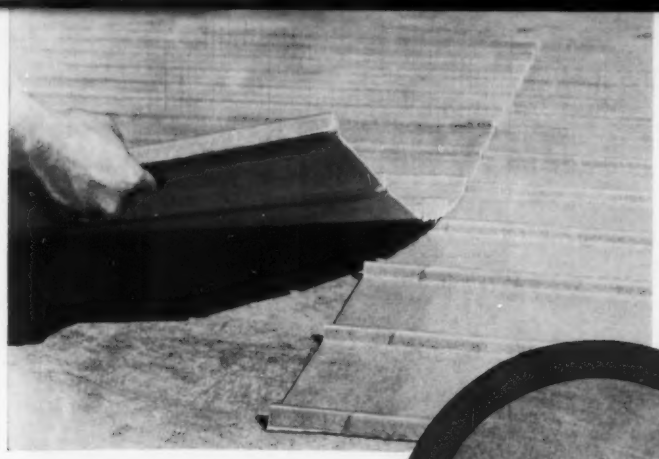
The makers point out that these panels, designed for application in and around the home as well as in commercial and industrial installations, are distinctive because of their new modular ribs as compared to other designs which are compatible with corrugated metal siding and are used primarily in industrial applications. Another advantage claimed for Chem-O-Glas panels is the uniformity of thickness of each press-molded panel, with thin spots and "resin-rich" areas eliminated. The material is flame resistant, shatterproof, and has color permanently dispersed throughout the entire panel obviating any painting.

Three Standard Designs

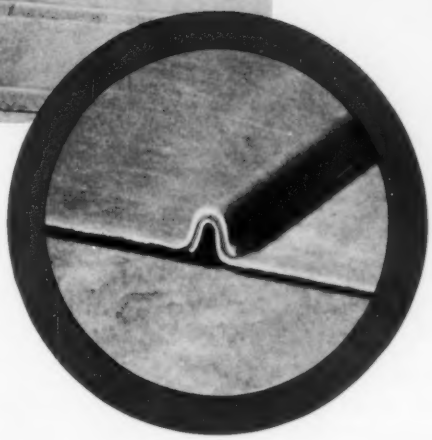
These polyester-fibrous glass panels are available in three standard designs for outdoor or indoor use as structural or decorative building panels. These three designs are: king-size ribbed panels, standard ribbed panels, and standard flat panels.

King-size ribbed panels are made $48^{15}/_{16}$ in. wide by 12 ft. long, with $^{3}/_{4}$ in. modular ribs 8 in. apart. They are press-molded with matched metal molds in what is reported to be the world's largest hydraulic press devoted exclusively to the manufacture of press-molded fibrous glass-reinforced plastics items. This press has a platen area of approximately 8 by 14 ft. with steel steam platens for heat conduction. Molds which rest upon these platens are made of high-carbon steel and are fitted with shear edges which not only limit resin flow but also produce trimmed finished panels.

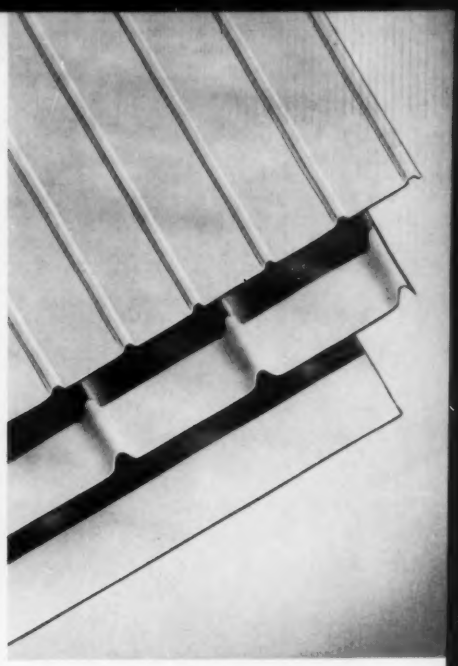
In addition to size, another important feature reported for this building panel is that the ribs at one end of every sheet are tapered to fit perfectly under the overlapping sheet. This taper is exclusive with the king-size panels and greatly simplifies installation with resultant economies in labor and material. The large panels also have tapered



Ribs on upper end of each panel are tapered to fit into the ribs of the overlapping panel to make a watertight joint of the end-lap type



Close-up of side-lap joint; watertightness is achieved because left-hand rib is smaller, thus fits snugly into the overlapping rib of next panel



Three designs of panels are (bottom to top): flat, king-size, and standard

Press-molded reinforced building panels for outdoor or indoor use have tapered end and side laps for simplified precision fitting

side laps for precision-fit weather seal.

Standard ribbed panels in this line are provided with overlapping ribbed joints for economical and easy outside installations and for attractive inside applications. Standard ribbed panels come from the mold 96 in. (8 ft.) long and 32⅞ in. wide (32 in. from center-to-center of outside ribs on each panel, to allow ready installation on 32- or 16-in. center-to-center joists, rafters, beams, etc.). The modular ribs are ⅜ in. high and spaced 4 in. apart.

Standard flat panels are 32 by 96 in. and are recommended for indoor or outdoor use as roofing, skylights, glare shields, trim, wainscoting, counter fronts, etc.

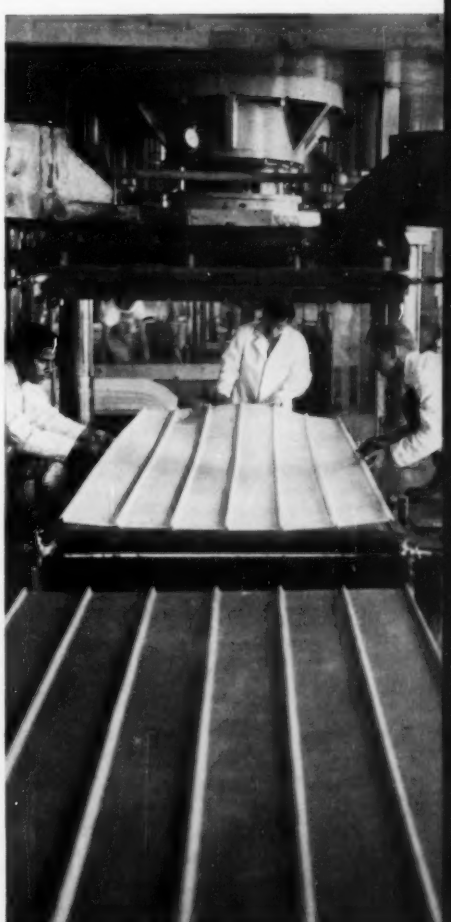
These Chem-O-Glas panels have been granted general approval by the Board of Building and Safety Commissioners of the City of Los Angeles under section 91.6101, wherever this type of plastic is allowed by the Los Angeles building code. Under investigations by the California Testing Laboratory, Inc., these panels have stood up to a 5-min. flame spread test wherein the temperature was brought up to over 1000° F. over a period of 5 minutes. Thus the panels are considered by the city to be "flame resistant." Under the State of California administrative code, these panels are classified as "combustible" but not "highly combustible."

Accessories

An extensive range of accessories including flashings, supports, mastic, aluminum screw nails, and coping are offered for use with the panels. It has been found that a specially made cadmium plate rib-clip is most effective in substantially increasing the wind load in roofs or outside partitions or walls.

With the makers reporting monthly sales to be continually increasing, these new structural panels are receiving much attention from builders and architects as well as from home owners.

CREDITS: Chem-O-Glas panels are produced by Chemold Co., Santa Monica, Calif., using General Electric's number 401 polyester resin as a base for Chemold's own formulation. Glass mat is supplied by Owens-Corning Fiberglas Corp., special pigments by Pittsburgh Plate Glass Co.



Set of king-size reinforced plastics panels being removed from mold

Why Clockmakers Turn

Courtesy Sessions Clock Co.

Molded white styrene desk clock case combines modern styling with compact design

Translucent corrugated acrylic curtain makes handsome setting for clock face

Courtesy Telechron Dept., General Electric Co.

LIKE the proverbial progress of time itself, the adaptation of plastics to the clock industry marches on . . . and on!

In contrast to the handful of plastics clock housings that appeared on the market prior to World War II, the amount of plastics used today—whether in the form of clock housings, faces, numerals, crystals, or other components—far exceeds that of wood, brass, or steel. Considering, therefore, the annual production of clocks in this country, which is generally well over 15 million units, and the annual retail sales volume of about $100 million, the clock manufacturing industry can well be classified as a rich and an important market for plastics.

In the electric clock field, there is hardly a single manufacturer, major or minor, who does not make an extensive use of plastics materials. It is estimated that more than 50% of the synchronous clocks produced in this country have plastics cases and/or crystals—and individual company figures often run much higher. Telechron Dept., General Electric Co., Ashland, Mass., for example, reports that nearly 75% of the models in its general line of electric clocks (with the exception of kitchen clocks, nearly all of which are housed in plastics) use plastics parts in a major capacity. Sessions Clock Co., Forestville, Conn., for another, points out that 65% of its electric clocks are made with plastics cases and/or crystals—a 15% increase over the past five years.

To date, however, the use of plastics in spring-wound clocks has not fared as well. There is still only a small percentage of such clocks that are housed in plastics, but leaders in the field are confident that the improved high-impact plastics and the new low-cost fabricating techniques will do much to remedy this situation.

Variety of Plastics

Even more staggering than these figures is the variety of plastics that have gone into the development of modern clocks.

Cases, some of which weigh as much as one pound apiece, account for the bulk of this material. Most of the earlier clock cases, those that appeared during World War II, were compression molded of phenolic, urea, or melamine. Today, while the thermosets continue to be used by the clock industry, especially for industrial clock and business clock applications, the majority of cases are injection molded of styrene, acetate, or butyrate—with styrene leading the pack. For some of the higher-priced clocks, housings machined out of transparent acrylic sheets or blocks are popular.

While clock cases naturally represent the more dramatic, large-volume plastics applications in the clock industry, minor components are not to be overlooked as a profitable market. Many manufacturers are improving the appearance of their clocks by adding three-dimensional numerals injection molded of styrene to the clock face.

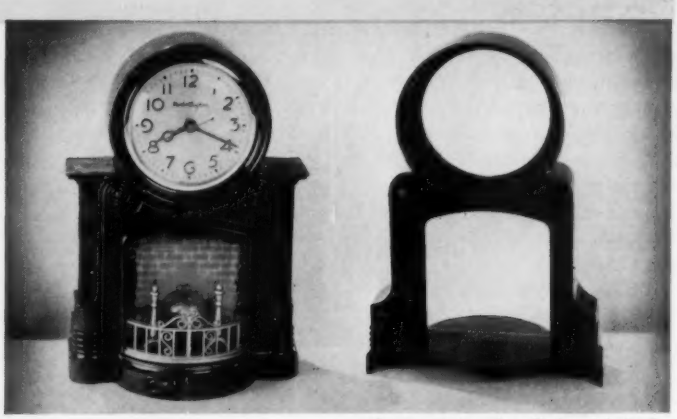
Even more are switching to injection molded transparent plastics crystals—and the development of the vacuum forming technique is expected to increase this number considerably. The makers of Telechron clocks have experimented with vacuum forming to produce crystals that are needed in small quantities, while Sessions reports that many of their new models to be introduced this fall will incorporate a vacuum formed crystal. Reports from both companies indicate that the formed crystals have already been well received.

Another possibility — glamorous clock faces or dials fabricated of metallized plastics sheets. One well-known manufacturer is even toying with the idea of pre-printing the hour numbers in distortion on a sheet of metallized plastic and then

to Plastics

Beauty, durability, and economy of plastics cases in which over 50% of clocks sold today are housed give the reasons

Courtesy Telechron Dept., General Electric Co.



Courtesy Mastercrafters Clock and Radio Co.

Acetate case (right) for animated clock (left) is molded in one piece

Styrene clock case is styled to meet the needs of current decorating trends

vacuum forming the sheet so that the three-dimensional numerals fall into register.

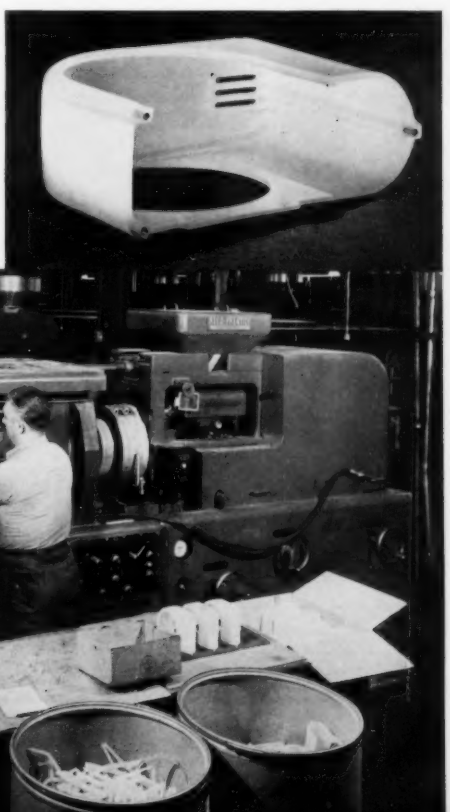
The reason for this widespread use of plastics materials in the clock industry is obvious—by taking advantage of the design potential of the material, the manufacturer can produce a magnificent time-piece styled to meet the needs of modern living and priced to fit in with the homemaker's budget.

Ivan Bruce, the product manager of Telechron clocks, puts it this way: "With plastics came the opening of an entire new world of opportunity for the clock designer. Where previously he had been severely limited in styling by the cost considerations involved when working with wood or metal, the designer

Courtesy Westclox Div., General Time Corp.

Light bulb blinking on and off inside the butyrate clock case is designed to awaken the sleeper noiselessly

Vertical ridges molded into the curved edge of the case (right) provide optimum light transmission where it is needed



After molding, only sprues need be removed and a small amount of flash trimmed off case prior to assembly

Courtesy Chicago Molded Products Corp.

discovered in plastics the flexibility necessary to economically translate imaginative thinking into an actual product."

According to current production costs, a popularly-priced $17.95 molded styrene clock, incorporating, as it usually does, scroll designs, convolutions, and other decorative elements so popular in the modern clock, would have to sell for at least $30, if laboriously carved out of wood—and probably for more than $30 if other materials were used. In many instances, the cost of non-plastics clocks runs as high as two to three times as much as their plastics counterparts.

Molded-in Design

Much of this savings in production can be traced to the fact that decorative effects are molded directly into the plastic case, eliminating the finishing costs and painstaking detailed hand work that characterized yesteryear's ornate timepieces. At the same time, all of the parts necessary for the installation of the clock movement or the assembly of the plastic crystal, as well as such additional features as raised letters that spell out the manufacturer's name and operating instructions, can also be molded directly into the one-piece cases.

Rounding out the basic reasons for the general switch in the clock industry to plastics are the wide range of colors and coloring effects available in plastics; the non-corrosive properties of the material and the fact that the integral colors can not scratch, peel, or chip; the light weight of plastics; and the ease with which a molded plastics clock case can be cleaned.

It is in the popularly-priced kitchen clock category that plastics have found their largest volume market. Individual company estimates rate the number of plastics kitchen clocks being made today at anywhere from 70 to 100% of total over-all production—and many of these models boast sales figures that run well into the hundreds of thousands each year.

Telechron's "Swirl" kitchen clock, with an annual sales figure of over ½ million units, is an outstanding example. Thanks to a sound use of plastics, "Swirl" incorporates the same modern styling and the same efficient operation that are found in higher-priced clocks.

"Swirl" is molded in three separate parts. The round clock face, which includes molded-in silhouetted numerals, and the one-piece clock case are molded separately of styrene supplied by Bakelite Co. in 4-cavity molds; the dome-shaped crystal is injection molded of transparent styrene.

To assemble the colorful cup-shaped case to the clock face, three holes molded into tabs projecting from the edges of the case are matched up with cored bosses molded into the back of the clock face. Self-tapping screws through the holes and bosses hold the two parts securely together. The styrene crystal is then assembled to the clock face by simply snapping two tabs molded into the sides of the crystal into two molded-in indents at opposite ends of the face.

At the back of the clock face are various molded-in lugs, slots, and bosses which facilitate the installation of the clock movement and at the foot of the one-piece case is a molded-in slotted compartment designed for storing excess cord. "Swirl" is available in red, blue, yellow, and grey.

Designer Line

Telechron also makes use of plastics in its more expensive, highly styled desk clocks and living room clocks. The company's stimulating Designer Line, for example, consisting of six ultra-modern clocks, depends to a great extent upon plastics for appearance and operation. Of the six models in the line, four use plastics. Of these, only one, the "Turn-About," is housed in a molded styrene case. This sleekly styled one-piece case is skillfully designed to permit the clock to double as a standing desk clock or, with a slight adjustment, as a hanging wall clock. Scarlet hands and dial accents set off the handsome white case.

The other three Designer Line clocks use plastics to a lesser extent, but in each case the material contributes much to the appearance and operation of the unit. In the "Panorama" model, for example, a ⅛ in. thick sheet of corrugated Plexiglas acrylic, measuring 14½ in. wide and 6⅜ in. high and formed into a curved shape, serves as a decorative translucent backdrop curtain to set off the walnut top and bottom panels.

In the "Illumitime," an illuminated table or wall clock, an extruded translucent styrene sheet is inserted behind the perforated metal front of the case to diffuse the light shining through the holes to a soft glow that silhouettes the hands and numerals of the clock face.

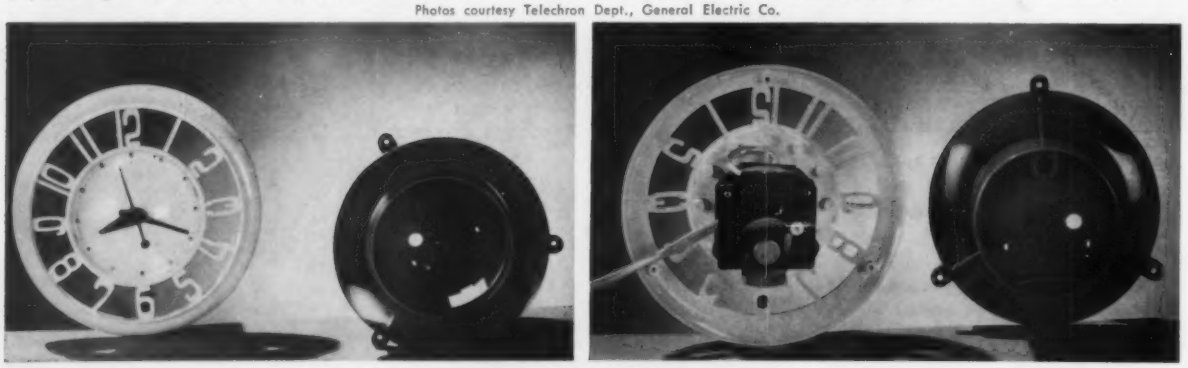
The fourth clock in the series to

(*To page* 220)

Styrene face (left) of kitchen clock has integral silhouetted numerals; case (right) has molded-in holes to accommodate clock mechanism

Rear view of molded face and housing shows the projecting lugs, cored bosses, and holes molded into both parts to facilitate assembly

Photos courtesy Telechron Dept., General Electric Co.



Photos courtesy Monsanto Chemical Co.

Adhesive-backed vinyl surfacing is simply hand-pressed into place on wall or table top

Film is applied to washbowl splash area to both waterproof and decorate it

Protective paper backing for film contains printed application instructions

Vinyl Surfacings—Self-Applied

Decorative calendered vinyl film with pressure-sensitive adhesive backing opens a big new market in home interior decoration

WITH the introduction of a new adhesive-backed calendered vinyl film that can be self-applied to almost any clean, dry, flat surface, the market potential for decorative vinyl surface coverings is given a decided boost. Sold by the yard in the piece goods departments of retail stores, the new material, by taking advantage of the current popular do-it-yourself trend, should do much to increase the volume of vinyl film going into home interior decoration.

The 0.004 in. thick Ultron vinyl film serves not only as a decorative material, but as a durable covering that protects the surfaces of walls, table tops, work areas, furniture, drawers, shelves, closets, or wherever else it may be applied. Most important from the standpoint of the busy housewife, the colorful film easily washes clean with mild soap and water.

The versatile material, tradenamed Con-Tact plastic fabric, requires no water, paste, or tools to apply. It is simply first cut to the required size with a pair of scissors and the protective paper which has been placed over the pressure-sensitive adhesive backing is peeled off. For added convenience, this paper backing has simple step-by-step application instructions printed on its face and is marked off in squares to guide the cutting operations if one or more panels are to be used. To peel the backing off the film, the corner of the backing is torn slightly and thumbnails are used as wedges to separate the two.

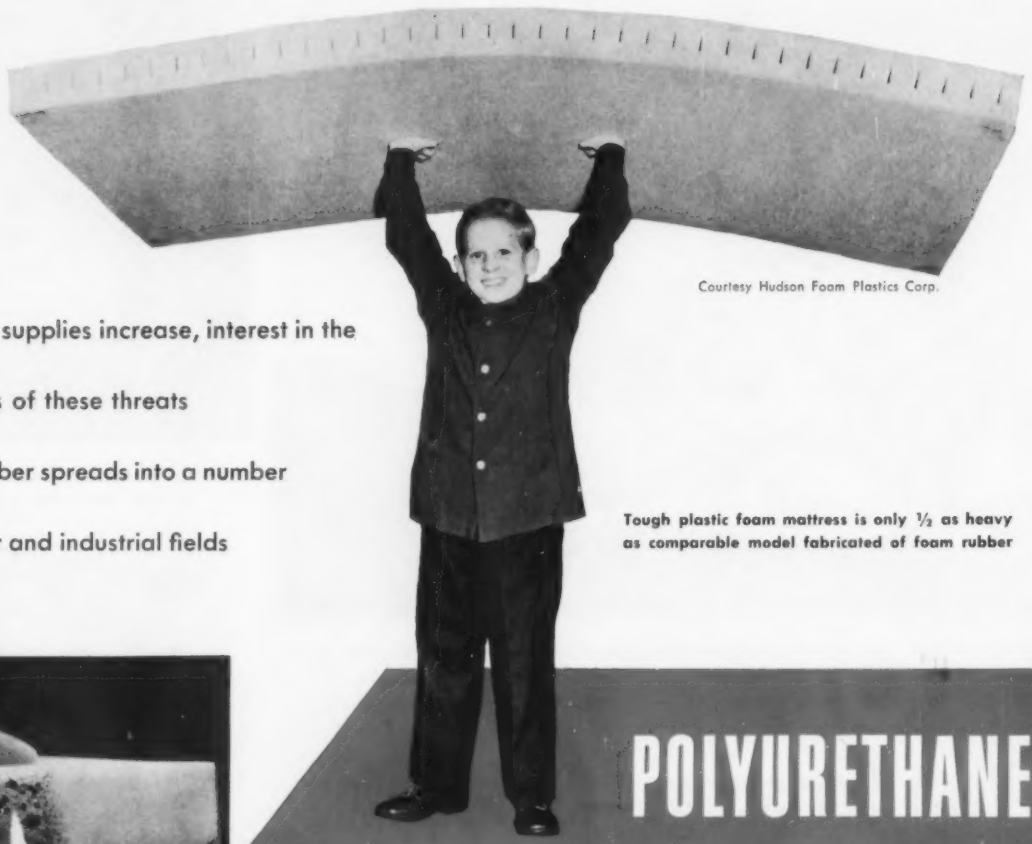
Adheres to Many Surfaces

Once a small segment of backing has been peeled off, the film is placed over the surface to be covered and simply pressed down as the rest of the backing is peeled off. The adhesive will stick to most any clean surface, including plastic, metal, wood, glass, tile, wallpaper, or enameled, painted, lacquered, and varnished surfaces.

Once the material has been adhered to a surface, however, it is still a simple matter to lift the flexible film from the surface in order to alter its position or to remove wrinkles and air bubbles. It re-adheres just as easily.

The Con-Tact film is available in 18-in. width in solid colors, peppermint stripes, gay kitchen and nursery prints, and woodgrain and marble effects.

CREDITS: Con-Tact was developed by Comark Plastics Div. of Cohn-Hall-Marx Co., New York, N. Y., in conjunction with Monsanto Chemical Co., suppliers of the Ultron vinyl film.

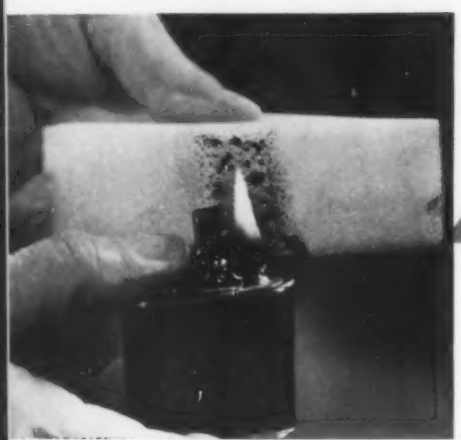


Courtesy Hudson Foam Plastics Corp.

Tough plastic foam mattress is only ½ as heavy as comparable model fabricated of foam rubber

As material supplies increase, interest in the applications of these threats to foam rubber spreads into a number of consumer and industrial fields

POLYURETHANE



Self-extinguishing polyurethane foam will not support a flame

Photos courtesy American Cello Corp.

Block of foam glued to molded styrene base makes an effective clothes brush

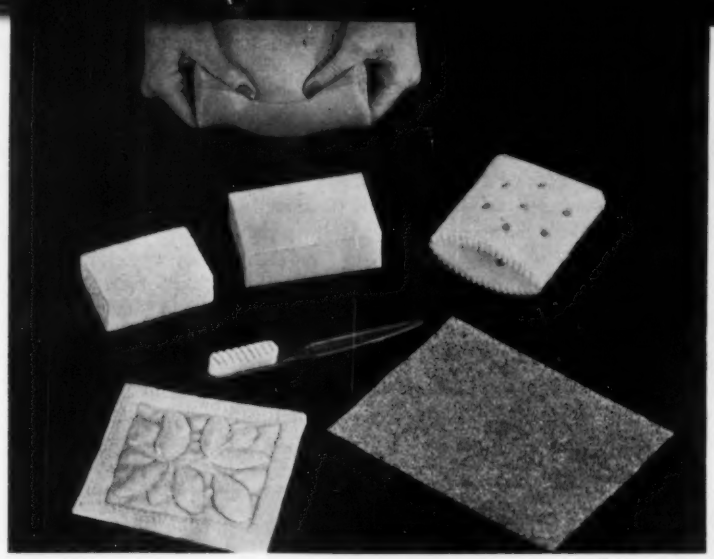
FOAMS from the family of polyurethane materials only recently introduced into the United States have already attracted the attention of a wide array of potential end-users. Well known in Germany for several years, these foams are based on a mixture of isocyanate resin and a type of polyester resin.

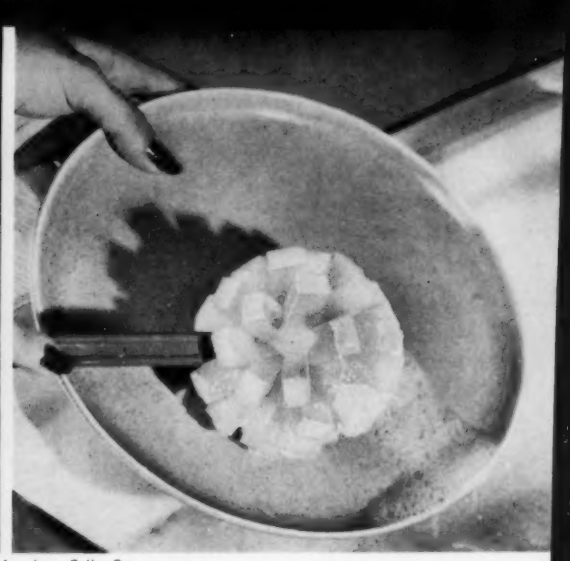
Since the polyurethane foams are so new in this country, the situation here is still confusing—and, at times, contradictory. Even nomenclature has been a subject of discussion. Some manufacturers, for example, call their end product polyurethane foam; others call it polyester foam. Whatever the name, however, the new foams are claimed to have advantages in physical and chemical properties that, as one manufacturer puts it, "spell an end to the dominance of foam rubber in many consumer and industrial applications." Just how far the new materials will go, however, is still a matter of conjecture and it is doubtful that the question will be resolved until mid-1955 when sufficient quantities of the foams will be available to American industry.

Polyester-Isocyanate?

Although polyurethane foams and so-called polyester foams outwardly appear to have much in common and certainly belong to the same basic family, manufacturers of each are adamant in claiming that they differ radically in chemical structure and physical properties. About the only thing common to the two, these manufacturers claim, is the fact that both use polyester resins and isocyanate resins as base materials. The differences lie in the types of resins used, the percentage of each that goes into the mixture, and the method employed in expanding to produce foam.

The foams are produced by combining a polyester resin with a di-isocyanate and various other materials. When water is added to the polyester-di-isocyanate reaction product, carbon dioxide evolves to





Photos courtesy American Collo Corp.

Polyurethane foam, available in varying densities (top row), is versatile enough to be used in toothbrush (center). Foam can be embossed or laminated (foreground)

Dish-washing brush consists of long strands of sponge-like polyurethane foam inserted into styrene handle.

and POLYESTER FOAMS

form amide and urethane linkages. The liquid material expands with the introduction of the carbon dioxide into a dough-like mass that hardens as the cross-linkage progresses. By varying ingredients and techniques, open or closed cell structures can be produced. At the same time, varying the amount and type of resins used results in radical differences in end-product properties. Some manufacturers even use chemical blowing agents to expand the material.

Suppliers

In preparing this survey of possible applications for the new foams, the editors of MODERN PLASTICS called upon two companies—American Collo Corp., New York, N. Y., and Hudson Foam Plastics Corp., Yonkers, N. Y.

At the present time, practically all of the polyurethane material used in this country is imported from overseas, primarily from Germany where products fabricated of the foam have been on the market for about five years. By the end of 1954, however, American Collo, for one, expects to be in full-scale production on a complete line of polyurethane foam called Collo Allfoam. The technical director from the Collo factories in Europe is already here in the United States to set up the exclusive machinery and processes for production. American Collo expects to function as one of the licensees of the newly-formed Mobay Chemical Co., a joint venture of Monsanto Chemical Co. and Farbenfabriken Bayer, A. G., Leverkusen, Germany, set up to produce isocyanates—a major ingredient of polyurethane foam—in this country and to license companies that wish to use the foam under their exclusive process.

Hudson, who labels its product a polyester foam, also makes available sheets of foam, as well as finished foam products—sold under the trade name, Polyester Cush-N-Foam.

In addition to differences in chemical structure and physical properties, the two foams are also intended for different markets. With the exception of a few fringe areas in which they will naturally overlap, each of the foams is finding its own particular level in consumer and industrial applications.

Collo's polyurethane foam, for example, is paying particular attention to the household sponge and industrial markets. Because of the peculiar chemical structure of the material, there are infinite possibilities of cross-linkage during the production of the foam. As a result, foams can be produced having a wide range of physical characteristics and cell sizes. American Collo makes available some 200 different grades of foam, varying in weight from 30 kg./m.^{3} to 200 kg./m.^{3}—foams that are soft enough to be used as powder puffs and foams so hard and rigid they can be used as abrasives.

Polyurethane foam is also stated to be self-extinguishing when brought into contact with a flame. Other claims state that it will not age, oxidize, or rot and is not at-

tacked by oils, greases, or solvents; it is mothproof, verminproof, non-allergic to the skin, and will not support any fungus growth. Sun and tropical temperatures have no effect upon the material.

One of the major advantages claimed for polyurethane foam, especially in those applications where it will have to be immersed in water for any length of time, is its high moisture resistance. Because it can also resist water up to 212° F. and dry heat up to 350° F., polyurethane foam can be washed in boiling water, with soap if desired, or sterilized.

Finally, the expanded foam is reported to be an excellent thermal insulating and sound absorbing material.

Household Sponges

Taking advantage of these properties, American Collo intends to market by 1955 a complete line of bath and household sponges, bristleless dishwashing brushes, hand cleaners, corn and callus removers, and specialized foams for industrial use. Most of these products have already been successfully marketed in Europe by Collo Corp., the parent company of American Collo.

In designing the sponge products, which will form the bulk of the company's offerings, two characteristics of the polyurethane foam were put to effective use—first, the fact that the material will absorb up to 19 times its own weight of water and, second, the open inter-connected cell structure which is typical of the material. Because of this structure, any water that is absorbed enters only into the hollow part of each cell. The walls of these cells are individually water repellent. Hence, when the sponge is squeezed, all the water is forced out along with any impurities that entered with it. The polyurethane foam thus cannot serve as a culture medium for bacteria or virus.

The ease with which polyurethane foam can be fabricated and glued or stitched together makes possible the design of unusual household products that utilize the material's effectiveness as a sponge.

One such product, a sponging wash glove, is made by gluing two sheets of polyurethane foam together in the form of a mitten that fits snugly over the hand.

Another household product, a soap trap, is similarly made by gluing sheets of the foam together to form a pocket into which the bar of soap can slip. By simultaneously sucking water, soap, and air into the hollow cells of the foam, the soap trap assures a continuous sudsing action. When not in use, air holes cut into the top of the trap permit the soap to dry while it is still stored neatly in the pocket of the unit.

This same principle of "continuous sudsing" is put to work in the design of a bristle-less dishwashing brush. The brush consists simply of several long, thick strands of foam inserted into a circular opening in

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Foam-Stuffed Tubbable Toy

Courtesy Monsanto Chemical Co.

Washable toy teddy bear is stuffed with moisture-resistant polyurethane foam

WITH an Orlon covering and stuffed with a shredded material cut from slabs of polyurethane foam, a new toy claims distinction as the first stuffed animal in toy history that can safely be laundered in an automatic washing machine.

Thanks to the moisture resistance of this new type of stuffing (described as a polyurethane foam by Mobay Chemical Co., suppliers of the basic chemical raw materials), the toy can actually be tossed into boiling water with a controlled suds detergent such as "all," and will come out clean and completely undamaged. In a series of tests conducted prior to the introduction of the stuffed toy, which is now available in the form of a teddy bear, dog, or cat, the product was repeatedly placed for 30-min. periods in an autoclave under 18-lb. steam pressure and at temperatures of 225° F. According to the reports of the laboratory technicians, the toy hardly changed color and retained its original shape and texture.

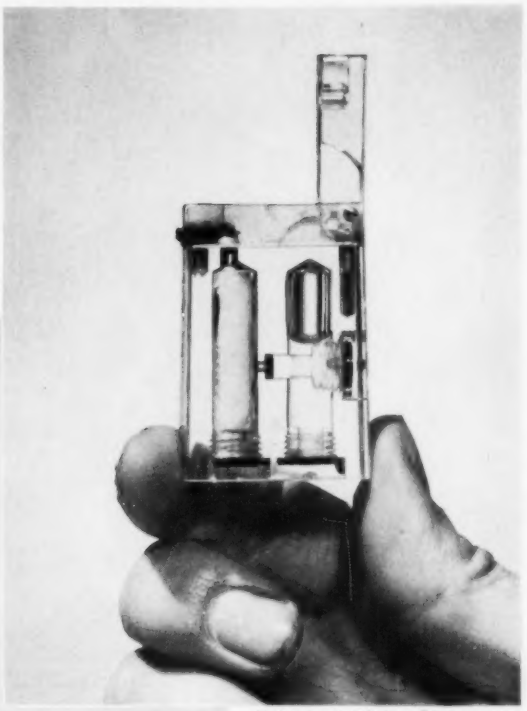
Unlike traditional Kapok or foam rubber stuffing, the mildewproof, non-allergic plastic foam stuffing will not mat, knot, or pulverize, nor will the resilient material sag or droop in any way after washing. Approximately 40 min. after the toy is removed from the washing machine, it is thoroughly dry—as resilient as when it went in, with no uneven or lumpy spots. The toy can even be safely placed in an automatic dryer—a treatment that would have disastrous effects on other types of stuffings.

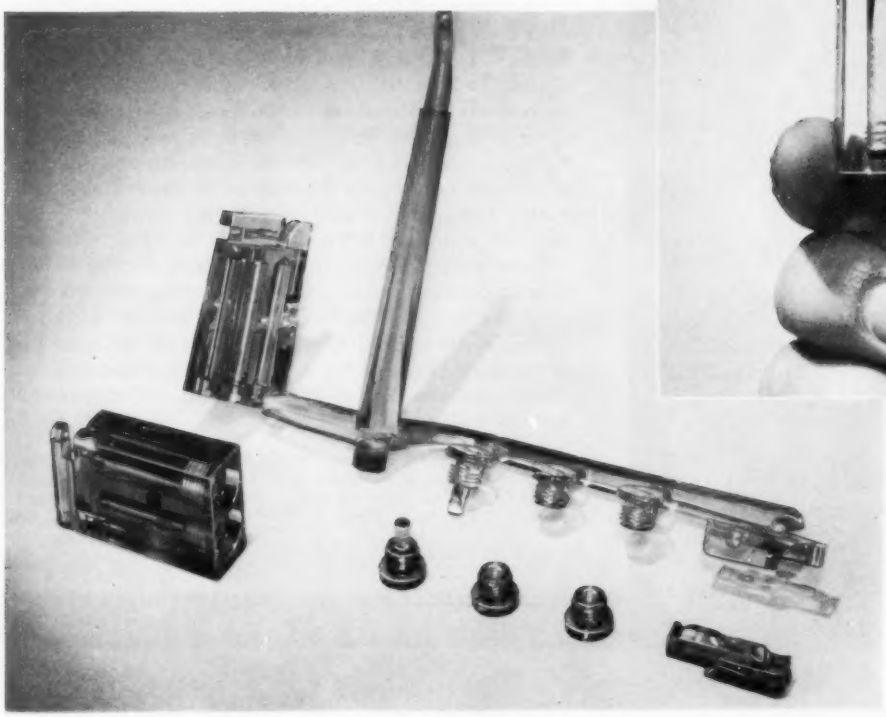
According to the manufacturers, the success of this toy will bring about revolutionary changes in the manufacture of all stuffed toys within the next two years—an indication of the fabulous future in store for the aggressive family of polyester-isocyanate foams.

CREDITS: Called the Bendix-"all"-washable teddy bear, the new toy is manufactured by Ideal Toy Corp., New York, N. Y., and is co-sponsored by Bendix Div., Avco Mfg. Corp., and Mobay Chemical Co. Mobay also supplies the raw materials for the Dryex foam stuffing. Orlon is supplied by E. I. du Pont de Nemours & Co., Inc.

Lighter in Acrylic

Molded cigarette lighter parts are produced in five-cavity family mold; assembled unit has hand-crafted appearance





Photos courtesy Santay Corp.

Compact, sparkling, transparent acrylic cigarette lighter is fabricated of five major parts which are molded in one shot (left) in a five-cavity family mold

SOMETHING new in cigarette lighters—a compact, jewel-like acrylic lighter which is virtually 100% plastic except for the wick, flint, spark wheel, neoprene gaskets, one metal stamping, and several small assembly bolts—has recently been placed on the market by Masonlite Corp., Missoula, Mont. The Masonlite lighter, patented features of which include both visible flint and fuel supply, and which is said to be the first plastic lighter guaranteed against leakage, embodies five basic plastic parts, all produced simultaneously in a five-cavity family mold running on a 9-oz. HPM injection machine. The lighter is completely molded, assembled, and packaged by a Chicago molder who cooperated in the final design and engineering of the unit, built the molds, and also fabricated the metal stamping which shields the top of the lighter against direct contact with the flame.

The first visual impression of this new lighter is that it has been painstakingly hand fabricated from a single block of acrylic plastic material. Actually, preliminary versions of the lighter were made in this way. In translating the original conception into a molded unit which could be produced in large quantity at reasonable cost, the "feel" and appearance of a hand-crafted product have been remarkably preserved.

The Masonlite lighter is currently being produced in clear transparent acrylic and also in transparent red, green, blue, and amber hues. Standing 2 in. high and measuring 1 5/16 in. by 5/8 in. thick at the base, the lighter tapers slightly in width and thickness from bottom to top. This barely perceptible draft not only facilitates the molding operation but also prevents "top heaviness."

Factors dictating the selection of acrylic material for this product included its optical clarity and color range, its ability to be molded to the close dimensional tolerances required for smooth, trouble-free operation, its durability under constant handling, and, of course, the fact that the material is able to withstand prolonged contact with lighter fuels without being adversely affected.

The five basic molded plastic parts of the lighter are the main body, weighing slightly under 1 oz.; the hinged cap or cover which lifts upward to expose the wick; two fuel plugs, which screw into the base of the unit; and one metering plug, which screws in horizontally from the side.

Air bubbles constituted one of the

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PLASTICS

Adjustable Plant Feeder

Molded and extruded polyethylene and extruded styrene tubing are ingeniously combined in the "Prop-n-Feeder," a versatile new type gardening aid which is claimed to take the "guesswork" out of plant care. The attractively packaged unit includes 20 pieces of equipment sufficient to meet the needs of five plants. The equipment includes five molded polyethylene funnels, along with sections of transparent styrene tubing and slotted strips of extruded polyethylene which encircle the plant stem and lock over tabs on the funnel rims.

The supports may be used individually or joined end-to-end, depending upon the size of the plant to be serviced. Resiliency of the polyethylene provides a secure, leakproof, friction fit between sections. A short length of cellulose sponge at the base of the lower section provides a metered flow of water or plant food directly to the root system of the plant.

CREDITS: Molded by Perfex Plastics, Inc., 2632 S. Dearborn, Chicago, Ill., for Crest Specialty, Chicago 16, Ill. Polyethylene supplied by Bakelite Co., a Div. of Union Carbide and Carbon Corp., New York, N. Y.

Three-Piece Refrigerated Butter Dish

A versatile styrene butter dish, called Butter Ice Boat, has a removable bottom tray which holds ice to keep butter cold and fresh for table use during the hot summer months. The butter dish, which is actually two units in one, can be used with or without the ice tray. During the summer months, the ice tray is filled with ice cubes and friction-fitted to the base. At other times the ice tray can be removed and just the cover and base used. Ridges on the dish base prevent the butter from sliding. All three sections—cover, base, and ice tray—friction fit together to form a complete unit.

The unit is molded of styrene on an 8-oz. injection molding machine. All three sections are molded at once in a three-cavity family mold to produce one complete unit per cycle. The Butter Ice Boat is available in chartreuse, kerry blue, kanyon clay, and gray clay and is individually boxed in a two-color window package.

CREDITS: Molded for Jaydon, Inc., 482 Broome St., New York 13, N. Y. by Leaf Plastics, Inc., 135 Woodworth Ave., Yonkers, N.Y. Styrene supplied by The Dow Chemical Co., Midland, Mich.

PRODUCTS

Reinforced Plastics Hamper

Fibrous glass and polyester resin are combined to form a dentproof, rustproof ventilated hamper called Plasti-Hamper. The unit is 24 in. deep with an opening 12 by 12 inches. Rounded edges produced during molding eliminate the possibility of snagging garments. The manufacturer claims that the hamper can be washed in boiling water without harmful effects. The Plasti-Hamper is available in white, blue, yellow, green, pink, black, and brown with tops of contrasting colors in metallic, lace, straw, net, or marbleized patterns. All colors are permanently molded into the reinforced plastics.

Hamper is compression molded in one piece, using a single-cavity matched metal mold. The cover, also molded of fibrous glass and polyester resin, is hinged to the hamper by means of two aluminum buttons fixed to the body of the hamper. Ventilation is provided by a group of 75 holes punched into the back of the unit.

CREDITS: Manufactured by Gladwin Plastics, Inc., 275 Houston St. N. E., Atlanta, Ga. Fibrous glass supplied by Owens-Corning Fiberglas Co., New York, N. Y. Polyester supplied by American Cyanamid Co., New York, N. Y.

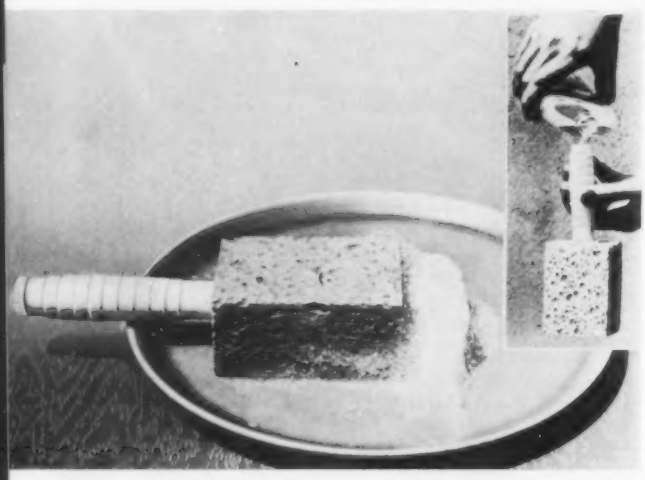
Plug-In Auto Spot Light

Small but powerful auto spot light plugs into the cigarette lighter of a car for use on the road and tucks away in the glove compartment when not in use. The light fits easily into the hand, or can be suspended by means of a swivel hook attached to the handle back. The handle and an integral cord spool are molded of urea. The reflector is aluminized styrene with a cellulose acetate butyrate lens which is permanently attached to the reflector rim. The complete unit, which includes a 12-ft. cord, weighs 6 oz. and is of sturdy construction to withstand normal abuse. The styrene reflector is aluminized by the vacuum metallizing process and is joined to the handle by two self-tapping screws.

The reflector is injection molded on a 12-oz. machine in an 8-cavity mold run at a rate of 120 cycles an hour. The urea handle is molded in an automatic compression machine in a 7-cavity mold running at 35 cycles an hour.

CREDITS: Manufactured by Wiring Device Dept., General Electric Co., Providence, R. I. Lens molded by C. & M. Plastic Co., Providence, R. I. Butyrate supplied by Eastman Chemical Products, Inc., Kingsport, Tenn.

Automatic Sudsing Dishwasher



Called Swish-O-Dish, a new dishwashing device has a reservoir for liquid soap or detergent in its handle; as the soap flows into the attached cellulose sponge, suds are produced. A baffle in the molded styrene handle controls the flow of soap to the sponge in such a way that the soap trickles through the sponge only when the device is in use. Filling the reservoir is accomplished by removing the friction-fit polyethylene cap at one end of the handle and pouring liquid soap into the cavity.

The styrene handle is molded in two parts in an 8-oz. injection molding machine using an 8-cavity mold. The sponge is scored and attached to the handle with a solvent cement. The dishwasher is available in green, yellow, pink, and blue.

CREDITS: Manufactured by H. Saffell Mfg. Co., P.O. Box 576, Chino, Calif., for E. Joseph Cossman & Co., 6612 Sunset Blvd., Hollywood, Calif. Styrene supplied by Monsanto Chemical Co., Springfield, Mass.

Vegetable and Fruit Juice Extractor

Electric juicer called Sweden Speed Juicer employs centrifugal force to extract juices from fruits and vegetables. All juices can be extracted in 10 sec. simply by dropping the fruits or vegetables, cut into large pieces, into the lid opening. The manufacturer claims that this method of extraction permits juices to retain their natural flavor and full vitamin and mineral content.

The unit, powered by a ¼-hp. motor, is a combination of plastics and metal. The housing and lid are compression molded of phenolic and urea respectively. The bowl is molded of cellulose acetate butyrate and features a molded-in spout to facilitate pouring. Lid, metal extractor basket, and butyrate bowl can be lifted from the unit for cleaning.

Single-cavity molds are used for all molded parts. The bowl is injection molded on a 20-oz. molding machine. The lid and housing are compression molded on a 220-ton press. Assembly of the parts is accomplished by the use of molded-in steel inserts.

CREDITS: Made by Sweden Freezer Mfg. Co., 3401 17th Ave., W., Seattle, Wash. Bowl molded by Plastal Specialties Co., 116 W. Denny Way, Seattle, Wash. Butyrate by Eastman Chemical Products, Inc., Kingsport, Tenn. Phenolic by Bakelite Co., a Div. of Union Carbide and Carbon Corp., New York, N.Y. Urea by Plaskon, Barrett Div., Allied Chemical & Dye Co., New York, N.Y.

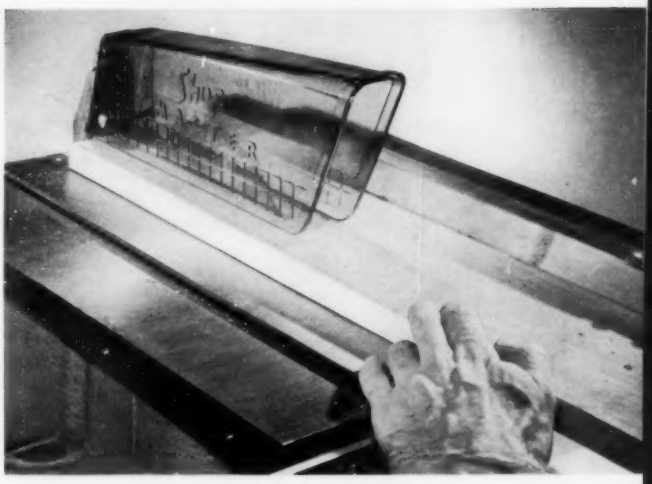
PRODUCTS

Transparent Safety Guard for Power Saw

Molded of cellulose acetate butyrate, a transparent safety guard for a table saw gives the operator an unobstructed view of the cutting edge at all times. Because it is light in weight, the guard easily adjusts to various board thicknesses. The guard attachment is identical to that used on Shopmaster power saws for conventional metal guards and will mount on any of the saws in that line. This unit replaces the cast or formed metal guards and is claimed by the manufacturer to be more satisfactory in performance because of its resistance to shattering, chipping, or corrosion.

The safety guard is molded on a 16-oz. injection molding machine using a single-cavity mold. The finished part weighs approximately 275 grams.

CREDITS: Molded by Flambeau Plastics Corp., 501 7th St., Baraboo, Wis., for Shopmaster, Inc., 1214 S. 3rd St., Minneapolis, Minn. Cellulose acetate butyrate supplied by Eastman Chemical Products, Inc., Kingsport, Tenn.



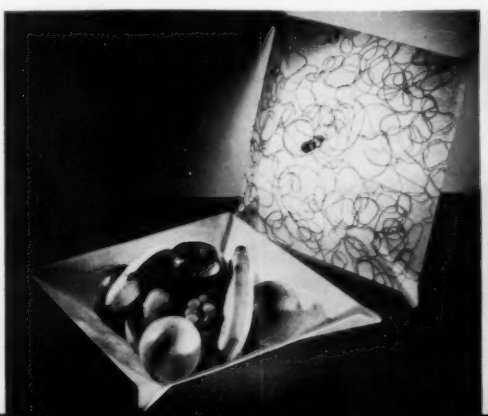
Light Diffuser Doubles as Tray

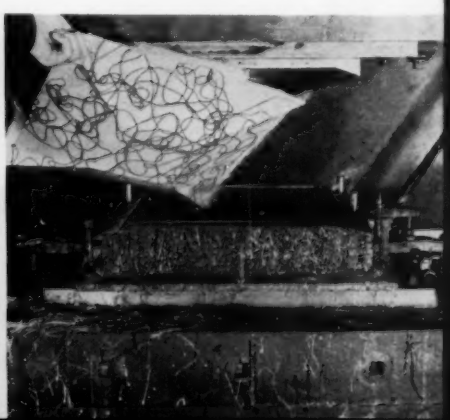
Versatile, high-styled fibrous glass-polyester ceiling-type light diffusers are designed to double as serving trays. The diffuser-trays, called Squarelite, can be used with conventional two or three bulb fixture assemblies or with snap-on and finial, for single bulb decoration. Removal of the snap-on or finial converts the diffuser into a decorative tray.

The square-shape, fluted-edge diffuser-trays can be obtained in a variety of sizes —9, 12, 13, 14, and 16 inches. They are also available in a wide range of solid colors, pastels, and special poodle effects. Units are lighter than metal, are rustproof, chip-proof, dentproof, and are virtually unaffected by boiling water, alcohol, and commonly used solvents.

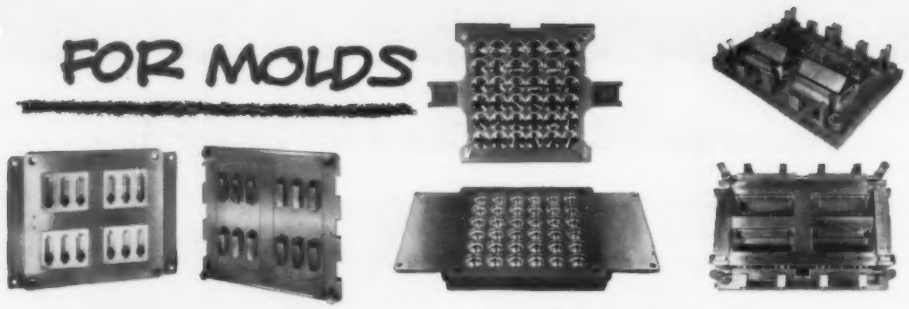
Diffuser-trays are compression molded at 100 to 125 p.s.i. in matched metal dies. These dies are chrome-plated, cored for steam, and have hardened shear rings. Since these diffuser-trays do not require preforming, a die-cut fibrous glass mat is used. A benzoyl peroxide catalyst is used and units are cured in the molds at 250° F.

CREDITS: Molded and manufactured by Duralastic Products Co., 2075 W. Lafayette Blvd., Detroit 16, Mich. Fibrous glass mat supplied by Owens-Corning Fiberglas Corp., New York, N.Y. Polyester resin supplied by Reichhold Chemicals, Inc., White Plains, N.Y.

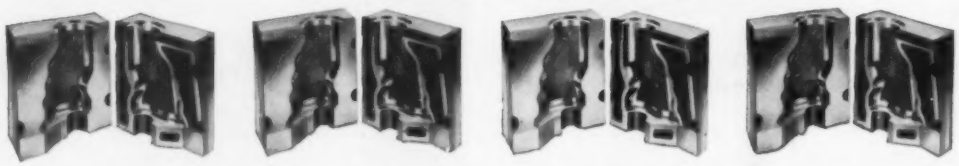




FOR MOLDS



FOR HOBBED CAVITIES



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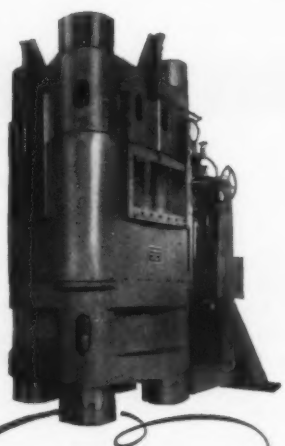

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F. B. Stanley, Engineering Editor

Economy in Record Molding

Brightly colored phonograph records are being produced at low cost through the use of a special set-up for dry coloring plus fully automatic molding machines

by CLARK GALEHOUSE†

High-quality, colored styrene children's records are produced at low cost

PHONOGRAPH record manufacturers are very price conscious; a saving of two or three cents a pound in the cost of molding material is of great importance. At the same time, any mechanical improvements in production equipment that will save time and labor costs are seized upon avidly and studied carefully.

Such economies are of particular interest in the production of children's records. Here the problem of color also enters the picture; brightly colored records have great attraction for youngsters, but colored molding compounds are more expensive than uncolored material. It is, therefore, of interest to such record manufacturers to employ the dry-coloring process for transparent styrene molding material that has been widely used for some time in other phases of the plastics industry. This process can ordinarily be carried out with a number of types of agitating and rotating mixers.

However, the dry-coloring problem is more complicated when it is applied to the special styrene intermediate material formulated specifically for phonograph records. The intermediate is a milky white material which, until just recently, has defied practically all attempts by molders to dry-color it successfully. The colorant must be completely mixed with the molding compound and streaks and color splotches cannot be tolerated in the finished molded records. The translucent colors are, of course, much more prone to such troubles than opaques.

Extruder Not the Answer

In one approach to the problem of dry-coloring this special material, one molder set up a system which included a preblender, an extruder, a long conveyor belt for cooling the extruded material, and a pelletizer. The operational cost of this equipment per pound of colored material —disregarding the capital investment—just about ate up the saving gained by the lower price of the intermediate as against factory-colored material. In addition, the relatively low hourly output of a reasonable size extruder indicated that several such set-ups would be required to color sufficient material to keep up with the requirements of the molding plant.

Some months ago the writer, faced with this perennial problem of reducing costs, started an investigation of all kinds of mixing equipment. During the course of this search, he came across reference to a centrifugal mixer made by Entoleter Div., The Safety Car Heating & Lighting Co., Inc., New Haven, Conn. Original use for this mixer, developed several years ago, was for killing weevils in wheat flour. The Entoleter mixer has an enclosed motor connected directly to a specially designed high-speed mixing rotor. This rotor consists of two steel disks spaced about 1 in. apart by specially designed impactors. The material enters the inlet (see drawing on page 116) and is directed to the center of the rotor from which it is spun out by centrifugal force into a film which thins out as it approaches the rotor perimeter. The material, mixed by this action, is discharged through the hopper in the bottom of the unit.

A few of these mixers had previ-

* Reg. U.S. Pat. Off.
† President, Shelley Products, Huntington Station, N. Y.

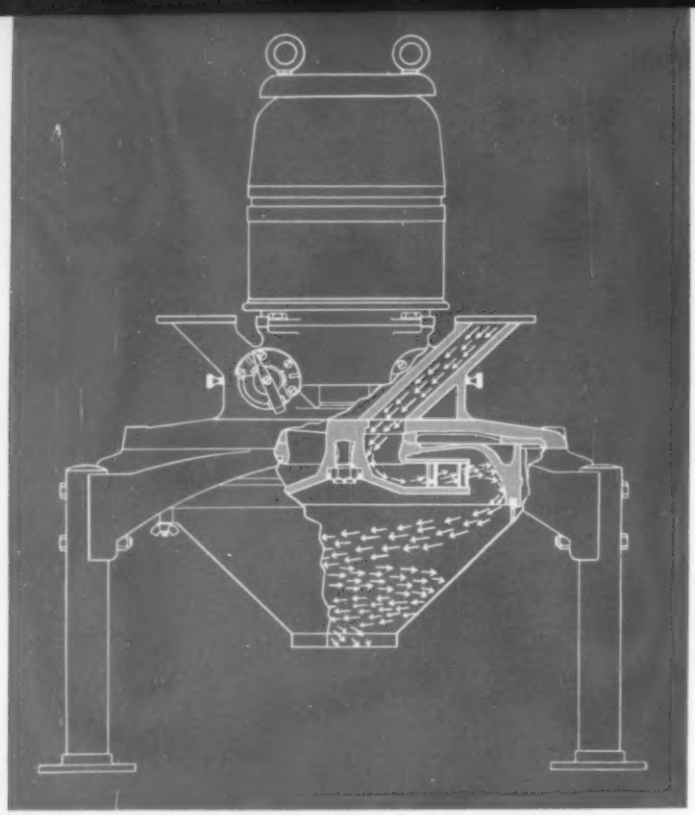


Diagram of centrifugal mixer. Material enters inlet and is directed to rotor center, where it is centrifugally spun; uniform discharge is released at bottom

As first step in dry-coloring record molding material, operator loads a 500-lb. batch of intermediate styrene into a special preblending unit

Next, a measured quantity of master colorant is added to the styrene in the preblender. The contents are then mixed for about 15 minutes

ously been put to use in the plastics industry, generally to provide just one of several steps in compounding.

Proved in Use

During a visit to the demonstration laboratory of Entoleter Div., several preblended samples of dry-colored material were run through the mixer. The results were so satisfactory that a set-up consisting of a ribbon-type batch mixer, or preblender, a screw conveyor feeder, and an Entoleter "Big Inch" mixer was immediately ordered. The screw conveyor is used to transfer the material from the batch mixer to the centrifugal unit. This equipment has been in operation for several months and very satisfactory results have been obtained, as evidenced by the clarity and freedom from streaks and color splotches of the phonograph records.

First step in the dry-coloring operation is to load a batch of intermediate phonograph record styrene compound into the preblender. In the unit illustrated, a batch consists of 500 pounds. Then a measured quantity of master batch colorant (H. Kohnstamm & Co., Inc., New York, N. Y.) is added. After replacing the cover of the mixer, the contents are mixed for approximately 15 minutes.

The rotor of the centrifugal mixer is then brought up to a speed of 3500 r.p.m., after which power is applied to the conveyor feed screw. This feed delivers the premixed material from the batch mixer to the inlet of the centrifugal mixer. Approximately 10 min. is required to transfer the entire 500 lb. from the batch mixer to the Entoleter.

Since the capacity of the centrifugal mixer used is far in excess of 3000 lb./hr., it can readily be seen that the mixer is never overloaded. In fact, the same mixer can handle over 12,000 lb. of material per hr., simply by using a motor of greater horsepower. In this particular set-up, with a 10-hp. motor driving the centrifugal mixer, the rate of feed is much higher than 3000 lb./hour. The operation is successful because the material is continuously fed for only 2 or 3 min. at a time, after which the feed is shut off momentarily while the full drum of dry-colored material is changed for an empty one. Because of the simplicity of design of both the ribbon blender and cen-

trifugal mixer, the cleaning operation when changing colors requires only a very few minutes.

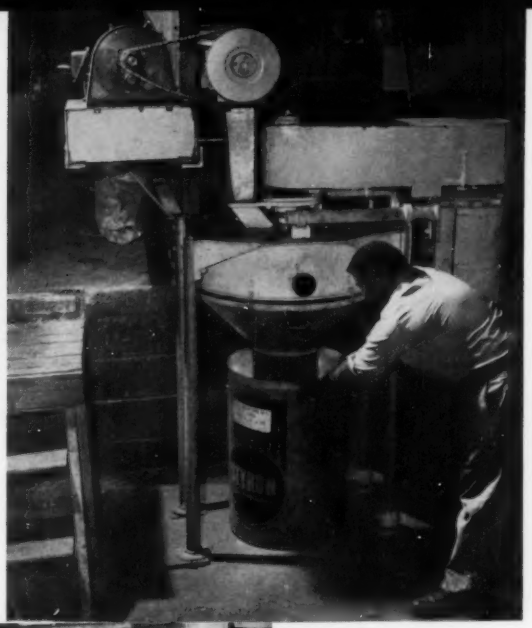
Approximately 1000 lb. of material can be dry-colored per hour with this set-up, and only one operator is required. The installation has been eminently successful and has effected marked savings in material.

Automatic Molding

In the same plant where the above described dry-coloring system is in use, an ingeniously designed set-up for molding styrene phonograph records on a fully automatic basis is also employed. The injection machine is a small Impco having a vertical clamp and horizontal injection. The record molds are center-gated. After injection, a round pin of the diameter of the hole in the record is forced upward through the center of the record by the lower hydraulic ram of the press. This rod not only pushes the hot sprue and runner back toward the nozzle but, at the same time, pierces a clean center hole in the record. As the mold opens, the record sticks on the lower stamper. A vacuum cup is then carried forward between the mold halves by a pneumatic cylinder. When directly above the record, the arm which carries the vacuum cup drops slightly so that the cup is in contact with the record. A vacuum is then automatically pulled, attaching the record firmly to the underside of the cup. The arm then raises slightly, pulling the record away from the lower stamper, after which the arm retracts from between the mold halves. In this retracted position, the center hole of the record is directly above one of four pins mounted on an indexing table. When the record and cup have reached this position the vacuum is automatically broken, and the record drops onto the pin.

The reason for the four stations on this indexing table is that the speed of molding is so high that if the records were all piled on one pin they would not have time to cool sufficiently and would warp.

Now, with the production plant set-up doing a continuous job of dry coloring record intermediate, and with brightly colored children's phonograph records coming off the machines on an automatic basis, it is felt that the ultimate in production economy has been very closely approached if not reached.

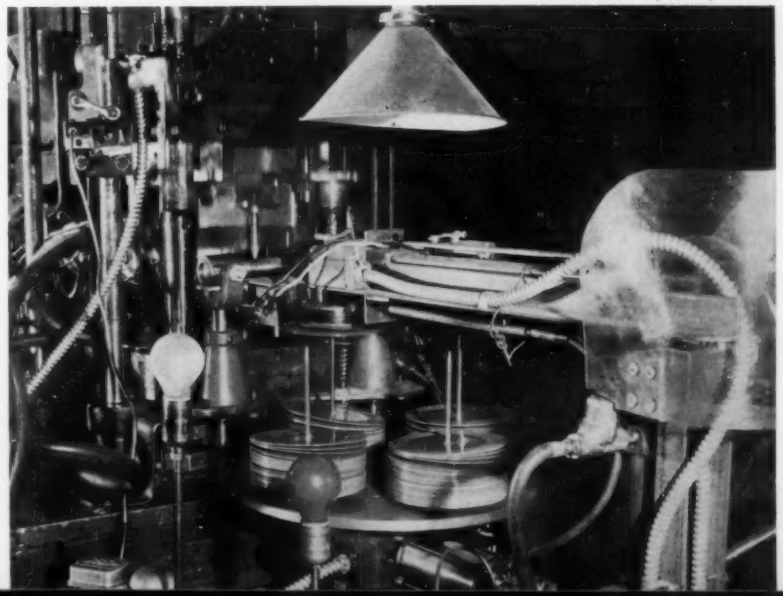


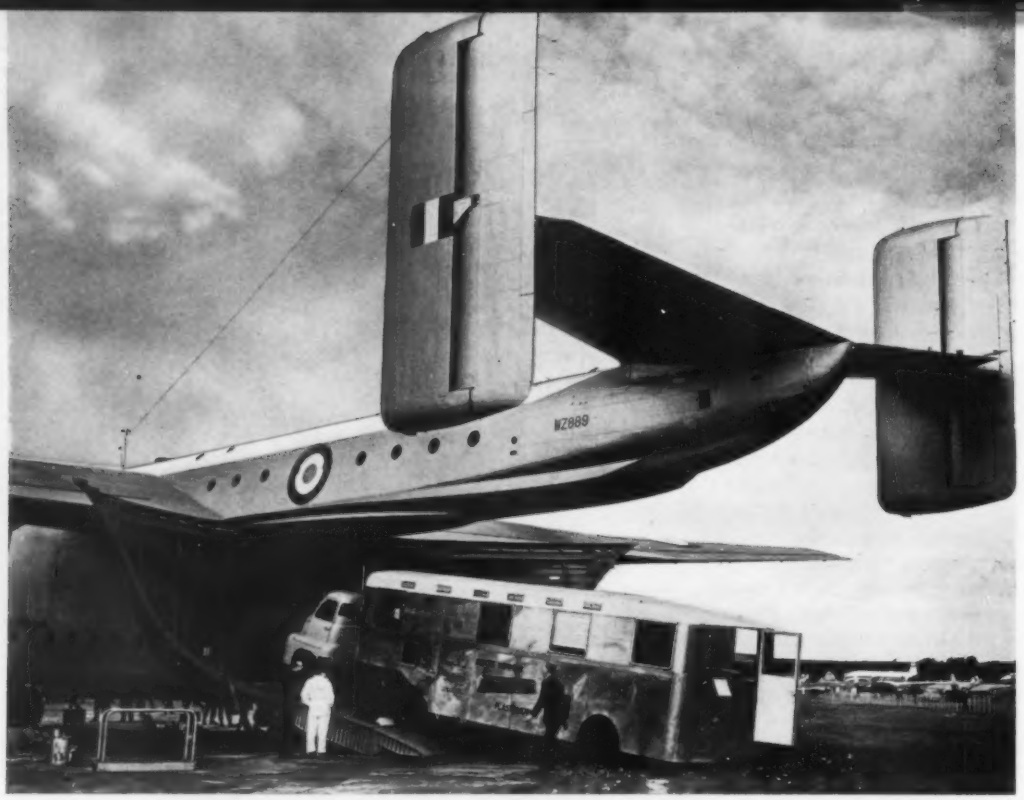
Over-all view of centrifugal mixer. Material from the preblender is fed into the centrifugal mixer by screw feed, requiring about 10 min. for a 500-lb. batch

Close-up view of centrifugal mixer, with material pouring out of large bottom opening into material drum. When drum is filled, worm feed is stopped and full drum is replaced with an empty one

Set-up for molding styrene phonograph records on a fully automatic basis. Center holes of records are automatically pierced clean following the injection phase of the cycle

Photos courtesy Shelley Products





Trailer-housed plastics pipe extrusion plant is being loaded aboard a British "Beverly" freighter. It will be flown to the site where plastics pipe is required and there, on the job, will produce pipe in the sizes and materials required

Pipe Made at Point of Use

Mobile extrusion plant in truck trailer may be flown anywhere to make plastics pipe, in a variety of materials and sizes, on the job

HIGH shipping costs on finished plastics pipe, and time wasted in shipment, have caused practical dreamers in the extrusion field to hope for a mobile set-up whereby an extruder could travel a trench and make and lay pipe at the same time.

While the realization of that dream is still in the future, a recent British development brings us just a step or two from that type of operation. That development is the R. H. Windsor Plastomobile.

It is a self-contained plastics pipe factory designed from the outset to be transportable by air and moved by road as a complete unit. It requires only a source of electric power and a supply of plastic material in order to produce pipe up to 6 in. internal diameter.

The unit comprises a heavily insulated semi-trailer van 30 ft. long. It weighs less than 10 tons with all machinery installed. It can be moved by road using any medium-size British or American towing tractor, fitted with a standard S.A.E. coupling and air brakes, or carried by air in the British "Beverly" or the American "Globemaster."

Installed in the trailer body is a Windsor RC 100 extruder which is designed to handle all normal thermoplastic materials without change in the mechanism. It will process 75 to 100 lb. per hr., depending on the material. This will result, for instance, in the production of up to 120 ft./hr. of 4-in. pipe suitable for conveying oil, water, gas, etc., at 200 p.s.i. working pressure.

Thus the materials may be selected

Exterior view of mobile extrusion plant. Heavily insulated trailer truck housing the equipment is 30 ft. long and weighs less than 10 tons with all machinery installed

Cut Labor Cost Down to Pennies per 1000 Pieces!

One of the Stokes 15-ton Model 800 fully automatic molding presses at the Wayne, N. J. plant of Mack Molding Company, Inc. The 800 presses handle all thermosetting plastics, including alkyds without press modification. Cycles are fast, mold cost low.

And increase production! And keep mold cost low!

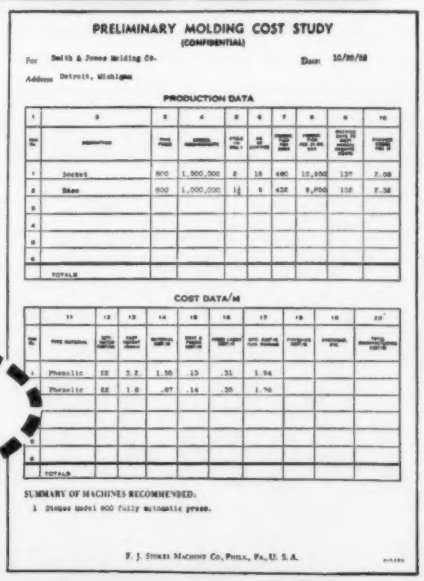
Labor cost becomes a negligible factor when you turn to fully automatic molding. Typical reports of custom molder experience show labor costs reduced as much as 90%.

When labor cost is low the molder avoids compromise decisions on molds . . . picks the size ideally suited to his production runs.

Mack Molding Company, Inc., a pioneer custom molder, is already tooled for five appliance parts on recently purchased Stokes Automatics at its Wayne, N. J. plant. Two 15-ton Model 800 Stokes fully automatic presses are used for this work on phenolic parts. Press time as low as 5 seconds, exclusive of cure, provides high production from a 12-cavity mold.

Send your parts or blueprints to Stokes for report on their suitability to fully automatic molding, and we shall send a free report like the adjacent facsimile giving a detailed production cost analysis. Also ask for the Stokes 24-page brochure on Fully Automatic Molding.

F. J. Stokes Machine Company
Philadelphia 20, Pa.



PRELIMINARY MOLDING COST STUDY
(CONFIDENTIAL)

For Smith & Jones Molding Co. Date 10/30/58

Address Detroit, Michigan

PRODUCTION DATA

1	2	3	4	5	6	7	8	9	10
1	Socket	800	1,900,000	2	16	480	10,650	137	2.08
2	Base	800	1,000,000	1½	9	432	9,050	102	2.38
3									
4									
5									
6									
	TOTALS								

COST DATA/M

	11	12	13	14	15	16	17	18	19	20
1	Phenolic	22	3.2	1.56	.13	.31	1.94			
2	Phenolic	22	1.6	.87	.14	.35	1.36			
3										
4										
5										
6										
	TOTALS									

SUMMARY OF MACHINES RECOMMENDED:

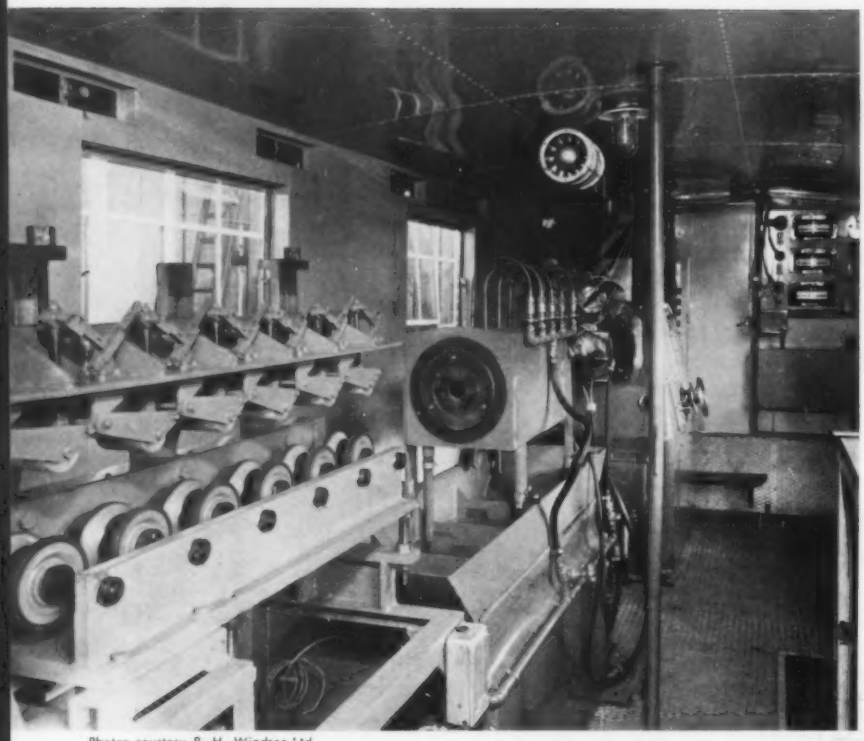
1 Stokes Model 800 fully automatic press.

F. J. Stokes Machine Co., Phila., Pa., U. S. A.

Typical Stokes report on molding cost study of parts to be made by fully automatic molding.

STOKES

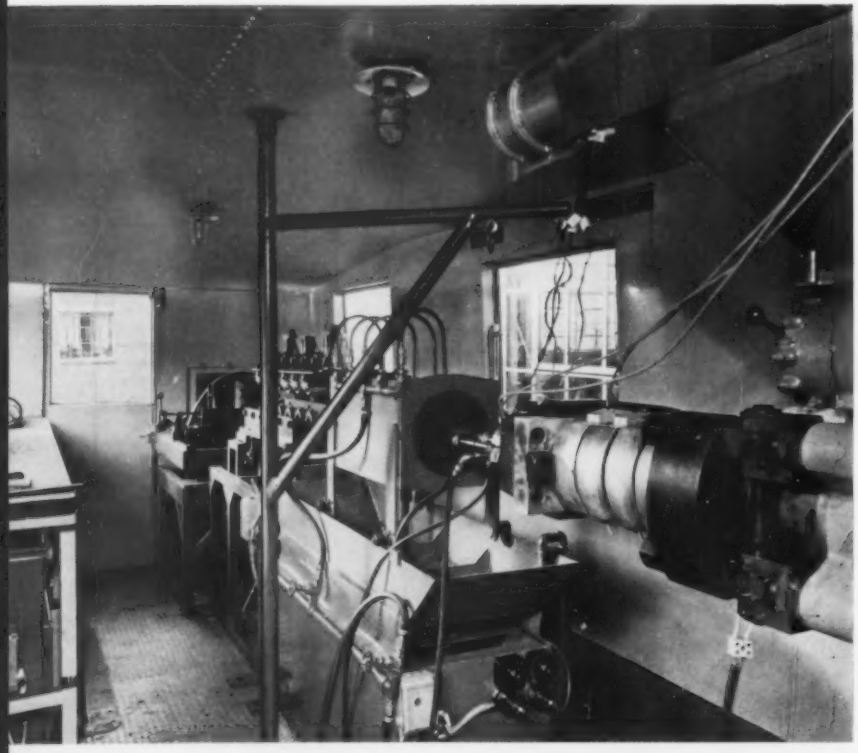
STOKES MAKES: High Vacuum Equipment, Vacuum Pumps and Gages / Industrial Tabletting, Powder Metal and Plastics Molding Presses / Pharmaceutical Equipment



Photos courtesy R. H. Windsor Ltd.

Interior view of trailer, showing extruder and take-off gear. The interior is air conditioned for operator comfort as well as for improved machinery temperature control

Rear view of extrusion equipment housed in trailer truck. In addition to extrusion machinery, van is equipped to provide materials storage for two days' production



and pipe made according to the usage for which the pipe is required and in keeping with the prevailing physical conditions. A wide range of materials is available, the most versatile of which, in the opinion of the designers, is the styrene copolymer group. Other materials are polyethylene, acetate, butyrate, polyvinyl chloride, polystyrene, etc.

Pipe size and wall thickness may be varied by changing the die on the machine and adjusting the take-off gear.

The machine is, as far as possible, under automatic control and requires a crew of only two men.

The interior is air conditioned to provide comfortable working conditions for the operators and also help maintain constant temperature control over the machine and its accessory equipment.

Water cooling, also under automatic control with independent refrigeration, is provided for the pipe forming die and for cooling the pipe as it emerges from the machine. Positive speed control of the take-off gear and a cut-off saw are included with the unit.

Materials Storage

Provision is made for the storage in the Plastomobile of a plastic supply sufficient for two full days operation and also for the heating and drying of these materials while they are conveyed to the machine. The British "Beverly" or the American "Globemaster" air freighter can carry a supply of plastic materials for 10 additional days of production.

A 25-kw. source of electric power is required to drive the unit. This may be taken from available power lines or from an independent electric generator which can travel with the machine.

Although, because of the comparatively slow speed inherent in present extrusion of plastic pipe, it is still not feasible to run the truck along the road as the pipe is being extruded, it is not far behind any reasonable person's imagination to see that it should not be too long before this development will reach that stage.

Because it is cheaper to ship extrusion material than finished pipe, because frequently the pipe must be laid in areas which are difficult to reach, the efficiencies made possible by this development are obvious.

Your best assurance of getting exactly the extrusion material you need is the range of resins and compounds available from Bakelite Company.

Colors are practically limitless with BAKELITE *Vinyl Plastics,* which include the clearest belting compound available. They can be printed or embossed, and have superior gloss. That's why they're so practical for women's belts, venetian blind tapes, zippers, and tubing. Flexibility, toughness, and resistance to chemicals and weather make them useful for wire covering.

For extremely light weight, use versatile BAKELITE *Polyethylene.* It's also noted for its dielectric strength and resistance to chemicals, making it useful for wire insulation, chemical tubing, flexible pipe. Extruded sheets are being used for vacuum forming. A cellular, expanded form of polyethylene further reduces weight for uses such as TV twin-lead wire.

Bakelite Company supplies other extrusion materials—*polystyrenes, impact styrene plastics, acrylonitrile-styrene plastics.* Keep up with the new developments in this fast-growing field by adding your name to our mailing list. Write Dept. YM-13.

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TRADE-MARK
EXTRUSION MATERIALS

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A Division of
Union Carbide and Carbon Corporation
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30 East 42nd Street, New York 17, N. Y.

Polyethylene, Polystyrenes, Impact Styrenes, Vinyls, Acrylonitrile-Styrenes

Bakelite Company Announces

. . . HIGH-GLOSS IMPROVED

These compounds are the result of an extensive research and development program aimed at producing impact styrene materials superior to any hitherto available to industry.

Compound *TGD-5001* is specifically formulated for extrusion into sheets for subsequent postforming.

Compound *TMD-5151* has been developed for injection molding.

Both compounds can be supplied in an unlimited range of opaque colors. Exhaustive tests assure blend-to-blend consistency so that color matches can be expected on orders received months apart.

Both types are highly desirable for refrigerator parts such as breaker strips, inner door liners, crisper trays, drip trays, and butter compartments . . . for signs and display panels . . . for toys, housewares, novelties, TV masks, dust covers, housings, and numerous industrial applications.

The choice of compound for any individual part will depend on which method, extrusion and postforming, or injection molding, offers the best economy for size, shape, and properties required for the specific part.

New modern production facilities assure continuity of supply on a commercial scale.

FEATURES

- **Permanent high gloss on leaving the extrusion die with no post-planishing necessary. Gloss is retained during postforming operations, particularly deep draws.**
- **Excellent heat stability—can be repeatedly recycled in the extruder without discoloring.**
- **Superior extrudability; close thickness tolerances easily maintained.**
- **Superior toughness.**
- **Formulated for ease in vacuum forming, permitting undercuts and more complex mold designs, without danger of cracking or breaking on release.**

FEATURES

- **Impact strength 8* times that of general-purpose styrenes.**
- **Fast setup reduces molding cycles as much as 10 per cent compared with that for previous materials.**
- **High plasticities provide easy flow into all parts of the mold, giving perfect detail even with intricate designs.**
- **Excellent surface gloss and resistance to stress crazing.**

*ASTM average Izod test values using notched ⅛ in. bar at 74 deg. F.

Getting the right properties for your plastics products is primarily a matter of selecting the right material.

The wide variety of plastics and resins available from Bakelite Company lets you select the one that fits your purpose best, and from a single source. A team of technical specialists is ready to help with any plastics problem.

Bakelite Company representatives are located in the major industrial centers. Contact them for further information about the new impact styrenes and other BAKELITE Plastics, or write directly to Dept. ZF-13.

BAKELITE TRADE MARK **GREATEST VARIETY, LARGEST RESOURCES FOR PLASTICS KEYED TO YOUR NEEDS**

Impact Styrenes • Polystyrenes • Acrylonitrile Styrenes • Polyethylene • Phenolics
Vinyls • Fluorothenes • Epoxies • Polyesters

IMPACT STYRENES

AVERAGE PROPERTIES OF TGD-5001

(Values obtained from extruded sheet)

Specific Gravity* (ASTM D-792-50)	1.03-1.09
Izod Impact, ft/lb/in. of notch ⅛ inch bar (ASTM D-256-47T)	
74 Deg. F.	0.8
32 Deg. F.	0.5
Tensile Strength, psi (ASTM D-638-49T)	3,300
Elongation in Tension, %	3.0
Flexural Strength (ASTM D-790-49T)	No failure
Modulus of Elasticity, psi	330,000
ASTM Heat Distortion Deg. F.	176

*Value will vary with color.

Large door panel for freezer is vacuum formed from TGD-5001. High impact strength of material is important to this application.

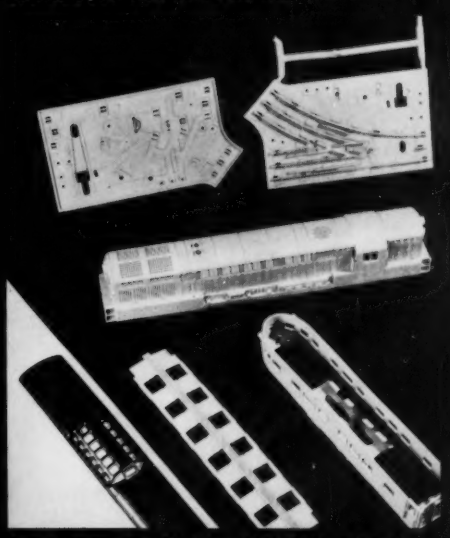
Display stand vacuum formed from extruded sheet of TGD-5001 demonstrates deep-drawing and deep undercuts possible with this material.

AVERAGE PROPERTIES OF TMD-5151

Specific Gravity* (ASTM D-792-50)	1.04-1.09
Izod Impact, ft/lb/in. of notch ⅛ inch bar (ASTM D-256-47T)	
74 Deg. F.	3.5
32 Deg. F.	2.0
—13 Deg. F.	0.7
Tensile Strength, psi (ASTM D-638-49T)	4,300
Elongation in Tension, %	30
Flexural Strength (ASTM D-790-49T)	No failure
Modulus of Elasticity, psi	375,000
ASTM Heat Distortion (¼ in. thick, 264 psi) Deg. F.	176

*Value will vary with color.

Refrigerator freezer door frame injection molded from TMD-5151 shows this material's adaptability to fabrication into intricate designs.



Toy train parts molded from TMD-5151, selected over other materials due to its good cold weldability, dimensional stability, strength in thin sections.

BAKELITE PLASTICS

TRADE-MARK

TRADE MARK

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario

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* *Unexcelled low-temperature flexibility*
* *Flame resistance*
* *Fungus resistance*
* *Resistance to water extraction*
* *Resistance to plasticizer "rub-off"*
* *Excellent dispersant for plastisol resins*

TOF comes to you direct from successful appearances in vinyl upholstery, rainwear, outerwear, coated fabrics, window channeling, cable jackets, strippable coatings, plastisols, and foamed vinyls. TOF may be the answer to your plasticizing problems.

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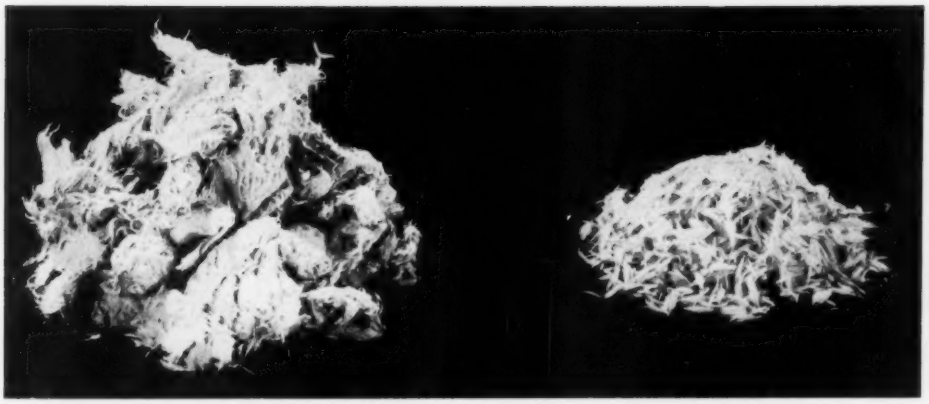

Fig. 1—Original melamine-glass material (left) has 9:1 bulk factor; new compound (right) has factor of 5:1

Case History of a Terminal Block

Melamine-glass molding compound, developed to meet demands by the U. S. Navy, is used in producing electrical parts which must meet high and rigid specifications

ONE of the all-time major developments in electrical panel boards for the U. S. Navy was the production, during World War II, of panels laminated of fibrous glass cloth and melamine resin. These panels had excellent electrical characteristics, superior mechanical properties, and were highly fire resistant.

As a result of work with this laminate, some laminators conceived the idea that, if this combination of melamine and glass could result in such good flat panels for electrical purposes, the same material, in chopped form, could be compression molded to produce high-strength contoured parts. To prove the idea, attempts were made to chop the impregnated cloth in the molding plants; only partial success was achieved, largely because the uniformity of the molding compound could not be controlled.

Bulk Factor

This non-uniformity resulted from variations in length of the glass fibers in the chopped compound. Even so, some excellent molded parts were produced, although the number of rejects was high. This, of course, militated against production runs because of excessively high costs. The commercial production of parts from this otherwise excellent material appeared doomed until the Navy insisted that the problem be solved. According to Charles Romieux of American Cyanamid Co., the pressure from the Navy was great but the research results, for quite a while, were disappointing.

About two years ago, American Cyanamid finally developed a material consisting of ½-in. lengths of glass fibers combined with melamine resin which could be successfully molded if sufficient loading space was available in the mold. The material was in the form of non-uniform hard lumps, many of which were as big as eggs; bulk factor was about 9 to 1. As a result of this high bulk factor many of the available molds for Navy parts could not be

Fig. 2—Terminal block, molded of fibrous glass-reinforced melamine, is shown here installed at bottom of terminal box. Material is classified as self-extinguishing

Photos courtesy American Cyanamid Co.

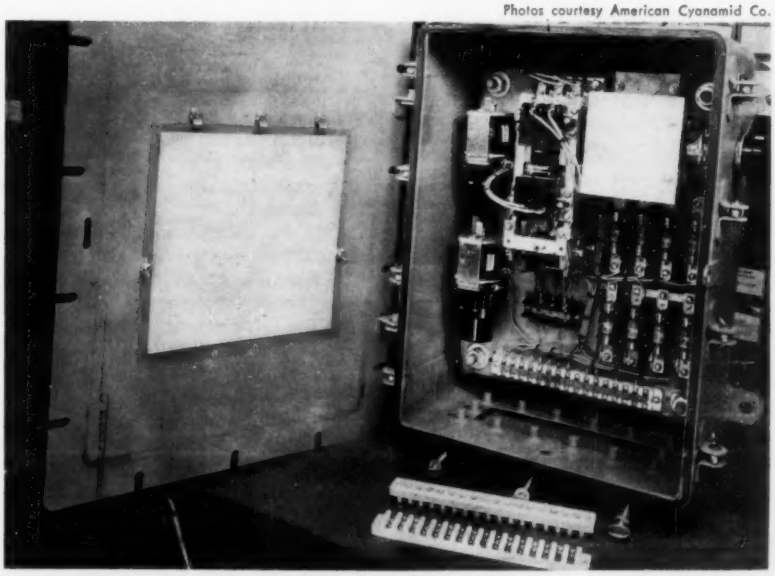

Fig. 3—First step in molding of terminal block is the weighing of a charge of molding material

Fig. 4—Preweighed charge of material is loaded into mold cavity by hand. Lower part of mold consists of two plates, the upper one of which provides positive loading space

satisfactorily used because not enough material could be loaded into them; they had been designed for lower bulk-factor materials.

Some molders tried to preform these lumps and thus reduce the bulk factor trouble. This entailed expensive hand preforming at comparatively high pressures but it did make possible the molding of some parts from this new material. Strength tests of such parts showed higher strengths than were necessary to pass requirements of M.M.I.-30 under MIL specifications.

Next step in the development program was to reduce the bulk factor of the material. According to Winslow A. Ward of American Cyanamid, technicians at the Bound Brook plant spent many months on this job before they came up with a compound which has a bulk factor of 5 to 1. A pile of the original molding material, with a pile of the new low bulk factor material, is shown in Figure 1.

The methods and equipment used for producing the new molding compound are highly confidential. The only detail so far revealed is that the success was partially due to a reduction in the lengths of the glass fibers. The flow of this material is reported to be so good that intricate and thin section parts can be molded with no "filling-out" difficulties. The compound can be preformed and preheated if required and can also be transfer molded with little if any loss in physical properties.

Several molders are now using this new material for producing electrical components which require its excellent properties. For example, Boonton Molding Co. is producing a terminal block (Fig. 2) for Ward Leonard Electric Co., manufacturers of electrical controls for Navy service. This particular terminal block is used, among other applications, in an electric motor controller, and serves to point up the advantages which the Navy has gained through the availability of this material. The blocks do not chip or crack, they have a high heat-distortion point, they are classified "self extinguishing" under "flammability," and they have an arc resistance of 183 to 186 sec. under A.S.T.M. test D-494-42.

Although this improvement on Melmac 3135 can be preformed, this step is generally not necessary or advantageous if only a single-cavity mold is being used. In the case of the terminal block described above, a single-cavity semi-automatic mold of the positive type, having a loading space of about 4 in., is being used. In the molding operation, the material is first weighed in a balance (Fig. 3), after which it is loaded by hand into the cavity of the mold as shown in Fig. 4, where the loading space can be easily seen. The lower half of the mold consists of two plates. The lower plate is a nest for the cavity while the upper plate is nothing but positive loading space. With such a mold, the operator dis-

Table I—Properties of Melmac 3135

Compression molding temp.—°F.	290-320
Compression molding pressure—p.s.i.	3000-8000
Specific gravity	1.94-2.00
Heat distortion point—°F. (264 p.s.i.)	400
Flammability	Self-Exting.
Water absorption (24 hr. at 25°C.)—%	0.09-0.21
Impact strength, Izod, milled—ft.-lb./in.	4.00-6.00
Flexural strength—p.s.i. ¼ by ½ by 5 in.	10,000-16,000
Tensile strength—p.s.i.	5800
Dielectric strength, short time, ⅛ in.—v./mil.	170-240
Dielectric strength, short time—100° C.	90-120
Dielectric constant—1000 cycles	7.6
Dissipation factor—%—1000 cycles	3.9
Dielectric constant—1,000,000 cycles	7.1
Dissipation factor—%—1,000,000 cycles	1.4
Arc resistance (A.S.T.M.)—sec.	183-186

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Fig. 5—As mold opens, knock-out pins push molded part from cavity upward until it is suspended just above top of loading space. Operator then removes part from pins

tributes the weighed material to a uniform depth in the cavity, after which the mold is carefully closed under low pressure until the material starts to flow; high pressure of 3000 p.s.i. is then applied.

Slightly different steam pressures are used in the cavity and force plug. The temperature of the force plug is held at 320° F., while the temperature in the cavity is somewhat lower. This temperature differential assures that the molded part will tend to remain in the cavity rather than stick on the force plug as the mold is opened. As the cavity drops away from the force plug when

(*To page* 222)

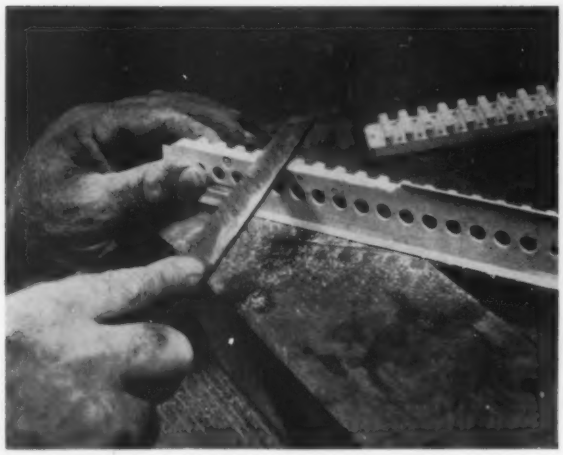

Fig. 6—After molding operation, thin flash on parting line of molded part is removed by use of standard mill bastard file

Fig. 7—Next step in production of finished terminal block is drilling of mounting holes. Drill jig has guide bushings for accurate hole location

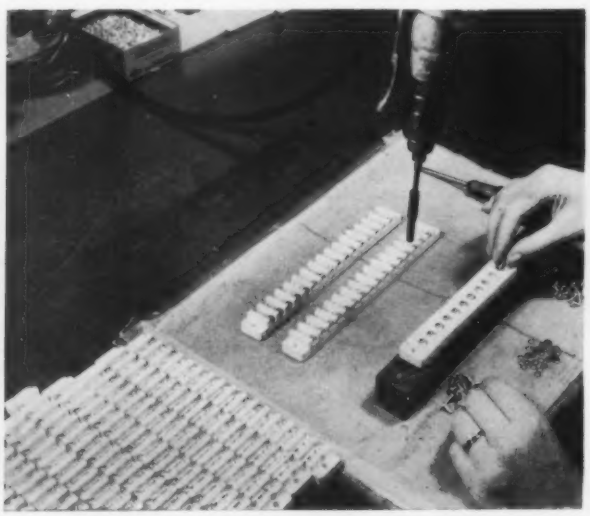

Fig. 8—Brass strips are assembled to terminal block in customer's plant. Here operator drops mounting screws into the block holes

Fig. 9—Assembly of the terminal block is completed by running up the previously inserted screws with an electric screw driver

Dust Irritation Problems

in fabricating reinforced plastics, and how they can be overcome

by ROGER B. WHITE*

WITH the growing use of fabricated reinforced plastics sheet for various electrical and mechanical applications throughout industry, there is developing an important need for information regarding the proper handling of these materials from a physiological standpoint.

Fine dust particles are thrown off from these plastics materials during machining operations. These particles are sometimes irritating to the skin and may be unpleasant to operators who work in the vicinity of such operations.

This dust factor can become an awkward problem or can be made an easy one, depending on how it is handled by the personnel involved. With the observance of a few simple precautions, the matter can usually be disposed of without difficulty.

First, it should be noted that the skin may be very sensitive when first exposed to such dust but will usually become quickly adjusted to it. In a matter of a week or ten days, the normal operator working in this medium has little or no more discomfort than on any other similar job. If this fact is not realized by the operator, he may become so emotionally upset over the situation, during the first day or two, that he will not stay on the job long enough to overcome his initial sensitivity.

Second, a high degree of cleanliness will help immeasurably to reduce the seriousness of the problem. Frequent cleansing during the day with a waterless soap and thorough washing with generous rinsing and changing into clean fresh clothes at the end of the day is important.

Third, it has been found that new operators give very little thought to the situation when they are brought into a group of people who have been working with these materials for some time and have become thoroughly accustomed to them. It is best not to expose a large number of new operators to this problem all at the same time, because they will be inclined to sympathize with each other and make the problem seem much worse than it actually is. For the same reason, it is wise, when this material is first introduced to a new organization, to select operators who can be expected to take the situation in stride, and to see that the nature of the problem is properly explained in advance.

Fourth, it should be emphasized to everyone involved that there is nothing toxic, poisonous, or other-

(*To page* 227)

Photos courtesy Russell Reinforced Plastics Corp.

Dust particles raised by a special counterboring tool are sucked up into an exhaust system through nozzle which is visible just to the right of the operator's left hand

Proper use of water aids in overcoming dust problems. In this sawing operation, dust is wet down by a stream of water directed against saw blade

Special waterless soap, if used diligently by operating personnel, contributes greatly to reduction of dust irritation problems

* President, The Glastic Corp., Cleveland, Ohio

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PLASTICS*
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Highly Intense Radiation Fields

and their effects on synthesis and properties of high polymers†

by DAVID S. BALLANTINE‡

During the past five years there has been much speculation on the possible application of highly intense radiations to problems in the polymer field and an increasing volume of research on the possibilities in the synthesis of new polymers and the improvement of the physical properties of presently existing polymers. Gamma radiation offers some unique advantages as an initiating agent in that 1) initiation can be effected at low temperatures where heat-sensitive monomers can be polymerized, 2) polymerizations can be carried out in the solid state, and 3) polymers can be made with no contamination from catalyst fragment. Recent work has shown that the physical properties of polymers can be markedly altered by exposure to radiation fields and that a vulcanization type process takes place. In this paper the work completed to date is reviewed and the industrial potential of intense radiation fields is evaluated. The types and characteristics of various sources of intense radiation that now exist or may exist in the future are discussed.

THE development of atomic energy with the accompanying production of waste fission products has produced not only a number of problems but also a number of opportunities. These fission products are radioactive and emit large quantities of beta and gamma radiation, which, since they are extremely hazardous, must be sent to safe storage facilities. Current practice at the isolated production plants is to store the wastes in large underground storage tanks where the radioactivity decays over a period of many years.

However, since the radiation from these fission products represents energy that is potentially of value, there has been an impetus to develop uses in industrial processes. Consequently, in the past five years or so, there has been an increasing volume of research at various institutions into the application of this radiation to a number of chemical reactions. The reaction that has received an appreciable portion of this effort is polymerization.

Initiation of Polymerization

Actually the history of radiation-initiated polymerization dates back to 1874 when Thenard (1)[1] described the formation of an inert, insoluble solid when gaseous acetylene was exposed to a "silent" energetic discharge (later believed to be alpha particles). After the discovery of radioactivity at the end of the 19th century and its subsequent development, chemists and physicists began to examine the effects of radioactive rays on various substances.

In 1925 Mund and Koch (2) and Lind and Bardwell (3) succeeded in polymerizing acetylene using alpha particles at room temperature. During the same year, Coolidge (4) obtained similar results with high energy electrons.

In about 1938, Hopwood and Philips (5,6) used radiation-induced polymerization as a technique for measuring radiation dosages. Employing alpha, beta, and gamma rays, as well as neutrons, they polymerized styrene and vinyl acetate, and measured the rates of polymerization dilatometrically. No further work was reported until recent years when the development of atomic energy stimulated research in this country and abroad. These studies involved the use of gamma, beta, and alpha radiation as well as neutron radiation.

Gamma-Ray Initiation

In 1947, Dainton (7,8) initiated an intense study of gamma and X-ray polymerization of acrylonitrile in aqueous solution. It was shown (9) that the polymerization was of a free radical nature and that initiation was caused by hydrogen and hydroxyl radicals. Dainton in later work (10) studied the effect of monomer concentration and dose rate over a wide range in an attempt to clarify the kinetics of the system. The dose rate dependence changed from 0.9 at low dose rates to 0.25 at high dose rates and a second power dependence on monomer concentration was noted.

Chapiro, in 1949 (11, 12, 13, 14), began a study of the polymerization of styrene, vinyl acetate, and butadiene, using gamma rays from a radium source for initiation. It was found that styrene had the lowest rate and vinyl acetate the highest. The polymerization rate of styrene was then determined in a series of solvents. The order of efficiency, which is also the order of ease of dissociation of the solvents when bombarded with photons, was carbon tetrachloride > alcohols > butylamine > acetone > nitrile > propylene > aniline > ether cyclohexane > heptane > benzene. These vinyl polymerizations were inhibited by traces of benzoquinone, indicating a free radical mechanism. The rate of polymerization was found to be pro-

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* Reg. U.S. Pat. Off.

† Paper presented at the 1954 Annual Conference of The Society of the Plastics Industry, Inc., in Cleveland, June 8, 1954. The research work was carried out under the auspices of the U.S. Atomic Energy Commission.

‡ Nuclear Engineering Dept., Brookhaven National Laboratory, Upton, Long Island, N. Y.

[1] Numbers in parentheses link to references at the end of the article, p. 230.

Table I—Polymerization of Perfluorinated Monomers

Monomer	*Dosage*	*Polymerization*
	Mrep	%
Perfluoropropylene	208.7	30
Perfluorobutadiene	225.6	55
Perfluoroacrylonitrile	196.4	20
Perfluoroisobutene	220	25–30
Perfluoroamylpropylene	231	15–20
1,1-Dihydroperfluorobutyl acrylate (FBA)	220	100

portional to the square root of the intensity, which differs from Dainton's first order dependence observed in aqueous solutions.

In 1953, Ballantine (15) showed by a copolymerization technique that the polymerization of styrene and methyl methacrylate is free radical in nature and that at high gamma intensities a first order dependence of rate on intensity is obtained.

Recently, Bernstein and co-workers (16) studied gamma-ray-induced polymerization of acrylonitrile. This group did not get accordance with either a half order or first order dependence.

An attempt was made by Ballantine (17) to polymerize a series of fluorinated monomers using cobalt^{60} gamma rays. The rates of polymerization and molecular weights obtained were very low. There was also evidence of cross-linkage in the case of 1,1-dihydroperfluorobutyl acrylate. These results are summarized in Table I.

In conjunction with staff members of the Polytechnic Institute of Brooklyn, this same group has been studying the polymerization of acrylamide in the solid state. High molecular weights and appreciable rates were obtained at temperatures well below the melting point. Radical initiation in the solid monomer was noted at temperatures as low as −15° C. (18).

Ballantine et al. (17) have been studying the polymerization of N-vinylpyrollidone in aqueous solutions. Complete conversions were obtained in 15 min. at intensities of 200,000 R./hour. The molecular weight requirements for use of the polymer as a blood plasma substitute have been met by variation of monomer concentration and solvent composition.

Bretton at Yale University (19, 20, 21) and Martin et al. at the University of Michigan (22, 23) have been attempting the synthesis of polyethylene at low temperatures and pressure. Bretton is working at room temperature and atmospheric pressure and studying the problem mainly from a theoretical viewpoint. The Michigan group, working at room temperature and at about 1000 p.s.i. pressure, have been able to produce 100-g. amounts of polymer and are currently studying the physical properties.

It is reasonable, in the light of work on cross-linking by radiation, to expect that the physical properties of polymers resulting from gamma initiation will be different from polymers produced by the more conventional initiators.

Beta-Ray Initiation

Polymerization by beta radiation has been accomplished either by true beta rays from radioactive strontium or by high-speed electrons from generators of the Van de Graaf type or other accelerating devices. In some unpublished work by Majury (24) methyl methacrylate was polymerized using microsecond pulses of high energy electrons from a Capacitron. He observed that the reaction was free radical and had low order dependence of reaction rate on dose rate. He also noted that irradiation of frozen monomers produced stable free radicals which, upon melting, gave the same reaction rate as the liquid monomer.

Schmitz and Lawton (25) polymerized methyl methacrylate, styrene, acrylonitrile, and tetraethylene glycol dimethacrylate. Irradiating the last monomer at various temperatures, it was shown that −55°C. is the lowest temperature at which the polymerization can occur. Upon irradiating at lower temperatures stable free radicals were created in the solid which only induced polymerization on heating the monomer to a semi-fluid state. Tobolsky et al. (26) showed, by the copolymerization experiment mentioned above, that vinyl polymerization initiated by beta rays is free radical.

Alpha-Ray Initiation

The only group active in the use of alpha radiation in polymerization initiation is Mund and co-workers (27, 28, 29 30). This effort has been mainly concerned with gaseous vinyl chloride using α-rays from a radon source. The rate, determined by pressure decrease in the system, is given by the equation:

$$\frac{-dn}{dC} = 1.0958 \times 10^{-5} (Pr)^2 - 1.2083 (Pr)^3$$

where n is the number of monomer units reacting, C is the amount of radon disintegrated, P is the pressure of the system, and r is the radius of the reaction vessel.

Neutron Initiation

Since 1948, Landler and Magat (31,32) have reported studies of polymerizations initiated by slow neutrons, using solutions of styrene in ethyl bromide. This type of reaction can be illustrated as follows:

$$Et_zBr^A + {}_0n' \rightarrow Et_z\,Br^{A+1} + h\mu$$
$$Et_zBr^{A+1} \rightarrow Et \cdot zBr^{A+1\bullet}$$

in which the bromide atom of the ethyl bromide absorbs a neutron and emits gamma rays, which is followed by the decomposition of the radioactive ethyl bromide into an ethyl radical and a radioactive bromine atom. It was found that the free radicals created by this primary process were responsible for less than 10% of the polymer formed, the remainder being formed by secondary center initiation. These centers are created by the capture and disintegration of gamma and beta rays as well as by the collisions between the highly energetic expelled atoms and the monomer molecules. The majority of free radicals are formed from the impact of expulsed atoms, while a small quantity is produced by all other processes.

From the foregoing it can be seen

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that it is certainly feasible to initiate polymerization reactions of the addition type using ionizing radiations. It has further been shown that the reaction proceeds by a free radical mechanism. However, to be of industrial interest the initiation by ionizing radiation should offer unique advantages if it is to be competitive with the conventional initiators. It is believed that there are some basic advantages in the use of ionizing radiation:

1) Polymerization can be realized at low temperatures where adverse thermal effects can be avoided. Also, if certain isomers are formed at low temperatures, this is possible to achieve with radiation.

2) No foreign substances such as catalysts or promoters are added, so the polymer formed is essentially pure.

3) Polymerization in the solid state is possible.

4) Radiation-induced polymerization has all the advantages of ultraviolet initiation as well as the penetrating power lacking in the ultraviolet.

5) Molecular weight control by temperature change can be achieved over a wide range since the initiation step is temperature independent.

6) The polymer formed may well have different physical properties since the radiation can attack polymer molecules in a polymerizing system causing branching and cross-linkage and altered molecular weight distribution.

What is required is a careful survey of the features of radiation-induced polymerization and consideration of the problems in the polymer field to determine where possible practical industrial applications may lie.

Table II—Radiation Resistances of Plastics

Plastic	*Exposure*	*Change in properties*
	10^{18} nvt	
1. Mineral-filled furan and mineral-filled phenolics: Duralon, Haveg 41, asbestos-fiber Bakelite, asbestos-fabric Bakelite, and Karbate	10	Little change except for darkening in color
2. Styrene polymers: Amphenol and Styron 411 C	10	Little change except for darkening in color
3. Modified styrene polymer: Styron 475	10	Impact strength and elongation decrease until the same as unmodified styrene polymers
4. Aniline-formaldehyde (Cibanite) and polyvinyl carbazole (Polectron)	10	Tensile strength decreases a little
5. Polyethylene and nylon	10	Impact strength decreases but tensile strength increases. These plastics become so brittle that the corners of the specimens chip off
6. Mineral-filled polyester: Plaskon alkyd	10	Tensile strength and impact strength are decreased about 50%
7. Unfilled polyesters: Selectron 5038 and CR-39	5	Develop small cracks. Tensile strength and impact strength decrease
8. Phenolics with cellulosic fillers: paper-base Bakelite, linen-fabric Bakelite, and Micarta	3	Become brittle, swell, and decrease in tensile and impact strength decrease
9. Melamine and urea: Melmac, Beetle, Plaskon urea, and Plaskon melamine	2	Tensile strength and impact strength are decreased about 50%
10. Unfilled phenolic: Catalin	1	Tensile strength and impact strength are decreased about 50%
11. Vinylidene chloride (Saran B-115) and vinyl chloride acetate (Vinylite)	0.5	Soften, blacken, evolve HCl, and decrease in tensile strength
12. Casein (Ameroid), methyl methacrylate (Lucite), Teflon, Fluorothene, and the cellulosics: cellulose nitrate (Pyralin), cellulose acetate (Plastacele), cellulose acetate butyrate (Tenite II), cellulose propionate (Forticel) and ethyl cellulose (Ethocel R-2)	0.1	Tensile strength and impact strength are decreased about 50%

Effect on Polymers

Radiation may be classed as light particle (beta and gamma) or heavy particle (neutrons). With both types most of the absorption of energy in materials occurs by ionization or electron excitation processes; however, for heavy particle radiation there is an additional process—elastic collision with atoms. In plastics, damage due to the initial displacement of atoms by elastic collision with heavy particles, is masked by damage due to ionization and excitation processes. However, much of the ionization is caused by fast-moving hydrogen ions (protons) ejected by elastic collision with fast neutrons.

The processes of energy absorption leave the polymer molecule with sufficient excess energy so that chemical bonds may be broken. In general, it has been observed that upon irradiation, polymers undergo either cross-linkage or degradation, depending on whether the bond broken is in the main polymer chain or between a carbon in the main chain and a lateral substituent.

Sisman and Bopp (33,34) have studied a very extensive number of commercial plastics with pile irradiations and gamma irradiations. They have determined the physical properties, tensile strength, hardness, elongation, etc., as a function of total dosage. Within a factor of two no difference was noted in the effect of pile versus gamma irradiation for equal energy absorption. This work was performed mainly from the viewpoint of searching for plastics that could be used as materials for reactor components. However, much data have been obtained for many

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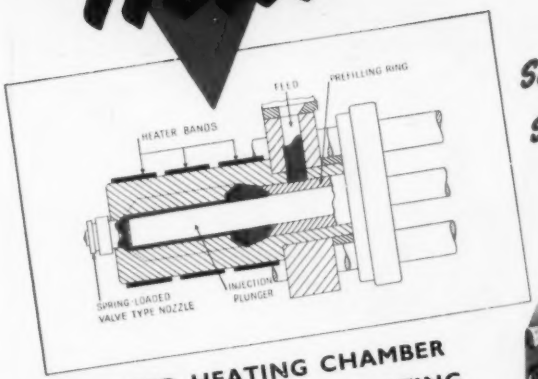

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Approximate weight of material plasticised per hour (Dependent upon weight per shot and material used)	22 lb.
Area of Injection plunger	2.074 sq. in.
Pressure per square inch on material at end of plunger	9,100 lb.
Total pressure on Injection plunger	18,850 lb.
Mold opens (adjustable)	6—9 in.
Maximum die space	7½ in.
Minimum die space	3½ in.
Maximum recommended casting area in mold	15 sq. in.
Size of die plates	16 x 10 in.

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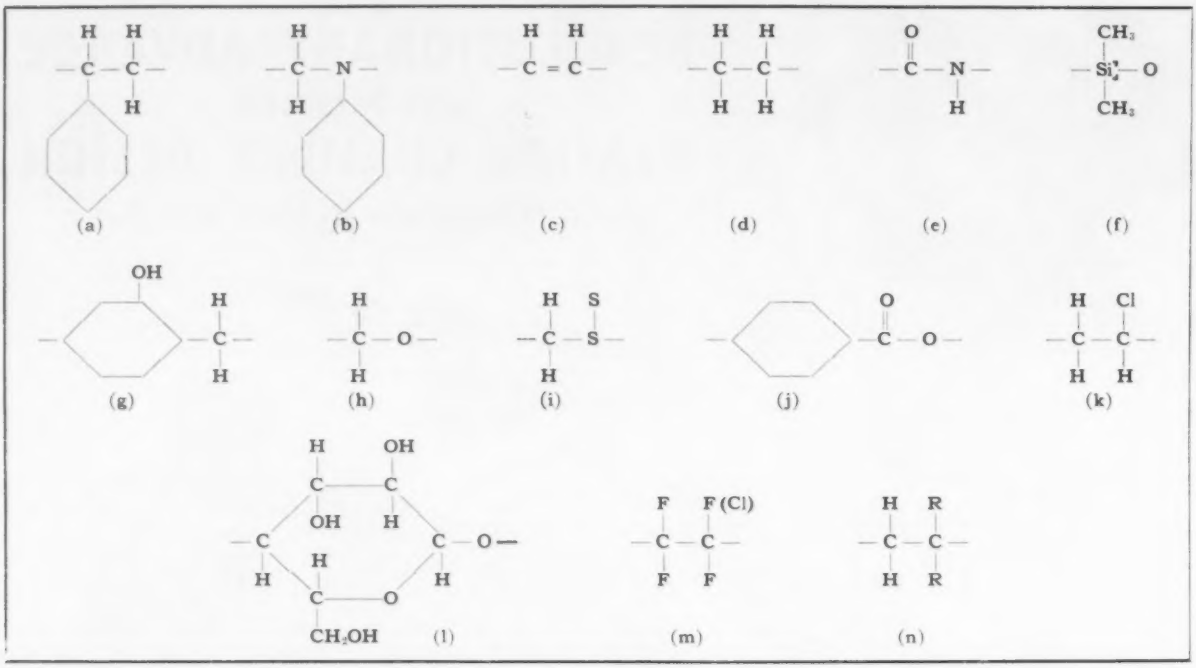

Fig. 1—Series of chemical groupings ranked in order of radiation stability. The high stability of groups (a) and (b) is attributed to the presence of the phenyl ring. Low stability of plastics in group (n), e.g. methyl methacrylate, is believed due to quarternary carbon

different plastics, so that some correlation has been possible between chemical structure and stability to radiation.

Table II, p. 134, taken from Sisman and Bopp (33), gives an indication of the radiation resistance of a series of plastics tested. Dosages are given in terms of 10^{18} nvt. This term is the product of thermal neutron flux times the irradiation time in seconds; there are 1.0×10^{9} rep per 10^{18} nvt.

Radiation damage is believed to be due to a degradation of the molecular structure. Sisman and Bopp found that the breakdown is accompanied by changes in mechanical properties of the material which usually occur by one of the following processes:

1) Elastic modulus, Rockwell hardness, tensile strength, and shear strength increase, but impact strength and elongation decrease. Then the plastic becomes so brittle that the tensile strength decreases and shortly the shear strength decreases. At about the same time the plastic cracks when the major load is applied in the Rockwell hardness test. Finally all strength is lost and the plastic crumbles. This type of failure occurs with Selectron 5038, plastics in group 8 to 10, and all plastics in group 12 except Teflon.

2) Elastic modulus, Rockwell hardness, tensile strength, and shear strength decrease, but impact strength and elongation increase. Group 11 plastics follow this process.

As a rule, no change occurred in volume resistivity or dielectric strength until the mechanical properties deteriorated completely. An exception to this is the group 11 plastics whose electrical properties decreased due to formation of HCl as a decomposition product.

All of the transparent or translucent plastics tested which had not crumbled after 10^{18} nvt became very dark and light transmission decreased.

The radiation effect on some materials is influenced appreciably by the presence and type of fillers or modifiers. For example, mineral-filled phenolics had higher radiation resistance than the cellulosic-filled or unfilled phenolics.

As a result of their studies Sisman and Bopp ranked a series of chemical groupings in order of radiation stability, as shown in Fig. 1.

Polyethylene has the simple structure of an unsubstituted paraffin chain and may be taken as a kind of basis for comparison. In the case of polyethylene, cross-linkage rather than chain cleavage occurs. This is evidenced by increase in hardness, tensile strength, and density. Infrared analysis indicates an increase in unsaturation and oxidation if the irradiation is carried out in air. It is suggested that the mechanism for damage of polymers that show radiation stability of lower order than that of polyethylene is predominantly by chain cleavage.

Several comments may be made regarding the series given in Fig. 1. The high stability of groups (a) and (b) is attributed to the presence of the phenyl ring, which has been found to be radiation resistant. This is generally believed due to the fact that the benzene system can dissipate excess energy by resonance. The group (g) plastics have the phenyl group directly in the main chain and show lower stability, but the decrease may be due to the presence of the hydroxyl group on the phenyl group. Group (k) is characterized by rapid evolution of HCl and it is known that loss of one molecule of HCl from a polymer molecule of this type promotes loss of further HCl. The fluorocarbons undergo rapid chain cleavage and

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  low temperature diester with low volatility and high efficiency
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  low volatility, good water immersion properties impart excellent low temperature permanence
- **Cabflex Di-BA®**
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@ 60.0° C.	7.80	0.23
@ 75.0° C.	1.66	0.525
@ 50.0° C.		
1 day	17.9	1.97
1 week	26.0	0.80
3 weeks	69.0	1.20
9 weeks	31.0	0.71
Low Temperature Properties**		
Passed	−20° F.	−10° F.
Failed	−30° F.	−20° F.
Retention of Elongation		
7 days at 113° C.	89%	83%
Pound Volume Cost***	44.7¢	48.0¢

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* *Commercially available 80° C. wire compound*

** *Bent around 0.118" mandrel*

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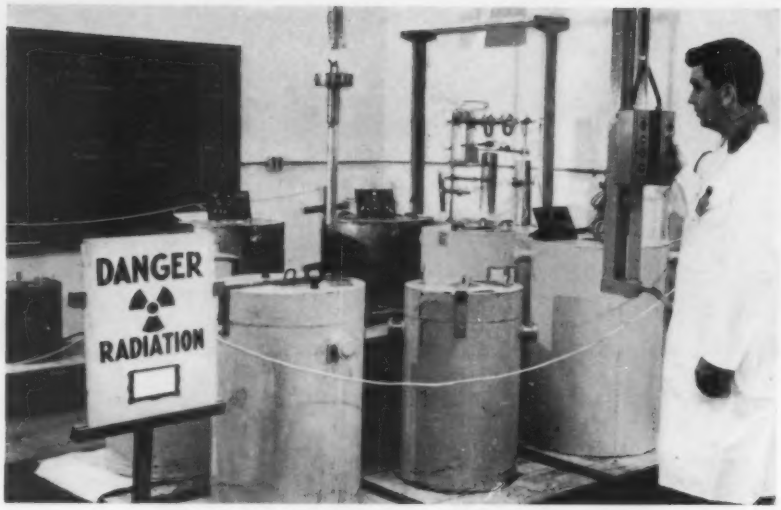

Fig. 2—View of an irradiation facility. Specimens to be irradiated are placed in aluminum canisters and lowered into radiation zone by means of a pulley arrangement

degradation and no loss of halogen. Charlesby (35) analyzed the decomposition products and was unable to detect any fluorine gas, but did find evidence for low molecular weight fluorinated hydrocarbon fragments. Apparently the C—F bond is so strong that the energy absorbed breaks the C—C bonds of the main chain preferentially.

The plastics in group (n), such as methyl methacrylate, polyisobutylene, and α-methyl styrene, exhibit very low stability against chain cleavage. These are all characterized by a quarternary carbon and it is believed that this is the carbon that is attacked in the chain cleavage process.

A report by Byrne and Mann (36) covers the effect of gamma radiation on polytrifluorochloroethylene (Kel-F) and polyvinyl chloride. They confirm the results of Sisman and Bopp that the halogenated plastics have a low resistance to radiation and undergo chain cleavage with evolution of fluorine and chlorine.

Charlesby (37) found that upon irradiation polymethyl methacrylate evolves a gas which remains trapped in the polymer mass. Upon heating, the polymer mass increases in volume by a factor of 6 to 8, yielding a product which he believed might have good insulating properties.

Lawton (38) at the G. E. laboratories irradiated a long series of polymers with cathode rays from an 800-kv. resonant transformer. He divided the polymers into those that underwent cross-linkage and those that degraded. Those that cross-linked included polyacrylic esters, polystyrene, polyesters, nylon, polyethylene, natural rubber, GR-S, butadiene-acrylonitrile, neoprene, and polydimethylsiloxanes. Those that degraded included polymethyl methacrylate, polyvinyl chloride, polyvinylidine chloride, Teflon, Kel-F, cellulose, and polyisobutylene.

The polymer that has received the greatest attention in the past few years is polyethylene. Charlesby (39) reported the observation that cross-linkage occurs upon irradiation in the BEPO pile and worked out a mathematical equation to calculate the amount of cross-linkage per unit of pile irradiation. The amount of cross-linkage was also checked by collecting the hydrogen gas that was formed during the irradiation. Charlesby believed the cross-linkage occurred mainly between the carbons in the main chains of the polymer molecules. Recently Dole (40) stated that the cross-linkage occurs through the side chains that are found in polyethylene as a result of branching during polymerization.

Charlesby showed that the cross-linkage gives rise to an increase in thermal stability and that irradiated polyethylene could be heated above the normal melting point without softening. Further irradiation results in a material that is brittle and easily fractured.

A recent report by Ballantine et al. (41) showed that while heat deformation properties are improved, the creep, elongation, and tensile properties are impaired. It was also found that if samples are irradiated in air a surface oxidation effect occurs, as shown by infra-red evidence for carbonyl and hydroxyl groups. Unsaturation was also noted, but this occurs throughout the entire volume of the material. These oxidation and unsaturation effects were also found previously by Dole.

Recently the General Electric Co. announced the production of a poly-

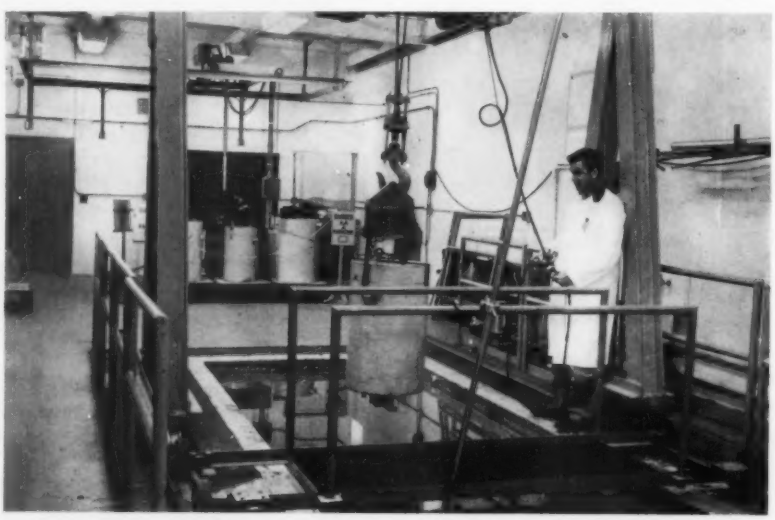

Fig. 3—View of an under-water irradiation facility. In this arrangement, radiation sources are placed at bottom of water tank, and the water acts as radiation shield

ethylene cross-linked by high-speed electrons under the name of Irrathene. This actual production of an item using ionizing radiation in the synthesis is encouraging to us in this field. At present there is a lack of theory on radiation effects on plastics systems and insufficient authoritative data to be able to predict which variables to change in order to obtain the desired properties. We believe that as more basic and applied research is expended in this field, new products will be appearing.

Brookhaven Facilities

At the present time Brookhaven National Laboratory is operating a gamma irradiation facility in which samples can be exposed to intense gamma fields. The radiation sources are cobalt cylinders about 13 in. long and 0.75 in. inside diameter, which have been activated by neutron irradiation in the Brookhaven reactor. Sources have been made with a wide range of curie contents and the radiation fields in the internal volume of the cobalt cylinders range from 20,000 to 500,000 R./hour. These cobalt sources are stored in large lead containers called "pigs," which shield the operator from the gamma radiation. Samples are placed in aluminum canisters and lowered into the radiation zone by a pulley arrangement. The volume which can be irradiated in one of these pigs is limited by the internal volume of the source. Figure 2, p. 138, shows a view of a number of these sources and lead containers.

Alternately, the sources can be placed at the bottom of a water tank in which the water acts as a radiation shield. This permits large volumes of material to be irradiated, albeit at some sacrifice in intensity level, since the maximum radiation field is obtained at the inside of the cobalt cylinder. However, a number of cobalt sources can be used together in an underwater experiment, and the radiation field built up by adding additional sources. The water facility at Brookhaven is 6 ft. wide, 15 ft. long, and 10 to 15 ft. deep. A view of this facility is shown in Fig. 3. A general description of this facility has been given by Manowitz (42).

For several years Brookhaven has been operating an irradiation service by which samples from industrial concerns can be irradiated in the above-described irradiation facility. The requirements which must be fulfilled are submission of routine AEC authorization forms and payment of a nominal irradiation charge. The only guarantee which Brookhaven requires is that samples submitted are not of a hazardous nature. Already considerable interest has been evidenced in this service by various industrial concerns including plastics, petroleum, food, and drug companies. Similar irradiation facilities are available at other sites. The Phoenix Project at the University of Michigan offers gamma irradiation services to industrial concerns. On the west coast the Stanford Research Institute at Richmond, Calif., also contracts for irradiation of materials. Battelle Memorial Institute is also equipped to conduct research in gamma irradiation.

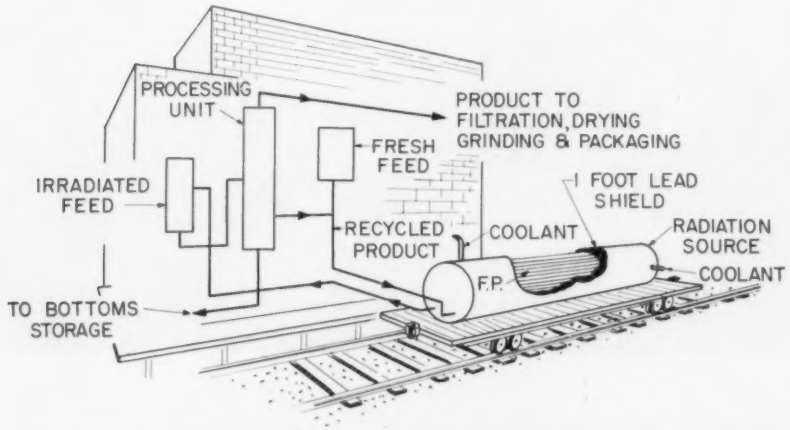

Fig. 4—Conceptual design of a gamma irradiator mounted on a railroad car

It is improbable that large-scale operations could be carried out with radiation sources prepared by neutron irradiation of cobalt or any other element. However, there are potential supplies of sufficient radiation for large-scale industrial operations in the radioactive fission products generated by nuclear reactors. The ultimate utilization of these hinges on the development of successful separation procedures.

Ultimate Uses

The form in which the radioactive fission products will be used will depend largely on the type of reactor from which they are removed. In reactors presently operating, the fuel elements are solid rods, which, after removal from the reactor, are sent to "cool" and then to a chemical processing plant where uranium and plutonium are recovered. The waste from this chemical processing contains the radioactive fission products and all the chemicals added during the processing. For maximum radiation efficiency, the fission products should be separated from the nonradioactive process chemicals, or failing this, the wastes should be concentrated as much as possible by evaporation or by pyrochemical techniques. Ultimately the radioactive wastes will be reduced to dry solids which can then be fabricated into various shapes or placed in vessels of various designs.

One conceptual design of a gamma irradiator is that of a calandria with fission products on the shell side, materials to be treated on the tube side shielded with 30 to 100 tons of high density material all mounted on a railroad car (Figure 4). The calandria and shield have a secondary cooling system for removal of heat. The unit could be delivered to the processing plant, connected to the fluid lines of the material to be treated, used till the radiation level falls below desired levels, and then returned.

Since the radiation from the fission products cannot be turned off, the fission product irradiators pose a considerable personnel problem. The irradiation devices must be so shielded that material to be treated can be easily exposed and removed from the radiation zone without hazard to operating personnel.

These irradiators could be built to

(*To page* 142)

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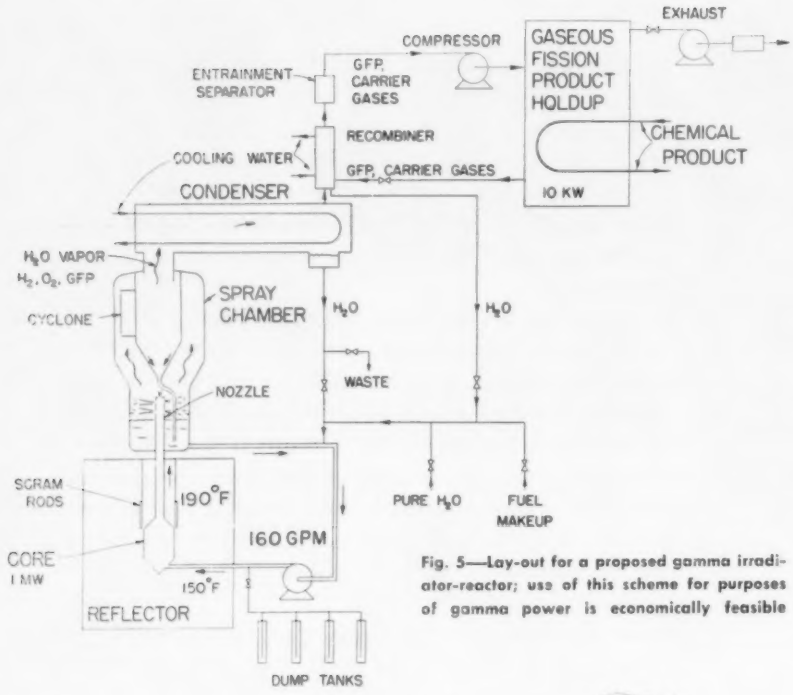

Fig. 5—Lay-out for a proposed gamma irradiator-reactor; use of this scheme for purposes of gamma power is economically feasible

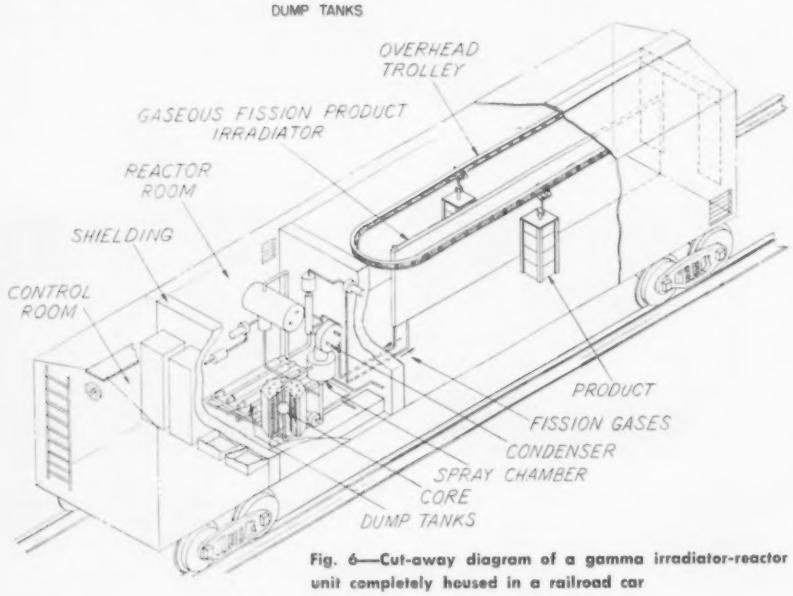

Fig. 6—Cut-away diagram of a gamma irradiator-reactor unit completely housed in a railroad car

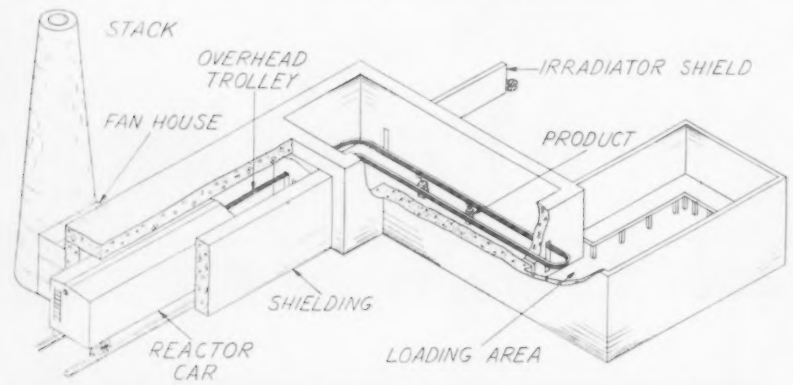

Fig. 7—Diagram of how railroad-car housed gamma irradiator-reactor would be used

any radiation level, the limits being set by the availability of waste material and size requirements from the viewpoint of mobility. The number that would be available would be dependent on the expansion of atomic energy as a whole. It is reasonable to assume that in addition to production reactors, there will be in the future large power stations driven by atomic reactors. Assume 180 days burnup, 100 days cooling for short-lived fission products, and 1000 days cooling for long-lived fission products. There would then be available from a 1000-mw. nuclear reactor 0.7 mw. of short-lived fission product power, and 0.03 mw. of long-lived fission product power every six months.

When you consider that mixed fission products will be available from all sorts of nuclear reactors, it seems reasonable to predict that some day there will be a supply of 10-kw. mobile gamma irradiators.

If use is made of fission products of short half-life, a replenishment of sources will be required every six months. A lesser number of sources containing half-life material could be relatively constant for periods up to 30 years.

Another possible source of radiation is an entire fuel assembly from the MTR type reactor operating at Idaho. In this instance the complete assembly containing fuel and fission products could be removed from the reactor directly to an irradiation chamber. Since the assembly would then contain all the short-lived fission products, extremely high radiation fields would be obtainable. This, however, would necessitate locating the plant next to or near the reactor site.

Gamma Irradiator-Reactor

Manowitz has proposed the construction of reactors with the main objective of isolating the gamma power for initiating reactions (43). This scheme is along the following lines. The present concept of nuclear reactors for atomic power is that heat energy supplied by the fission process would be used in a boiler supplying steam to a turbine-driven electric generator. At equilibrium the fission process releases about 200 mev for each nucleus reacting. About 80% of this energy appears immediately as heat. The beta and

(*To page* 228)

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Rigid Thermoplastic Sheeting

An examination of the effect of forming on their physical properties

by NORBERT PLATZER*

TWO developments have played an important part in the economical application of rigid thermoplastic sheetings as a material of construction. The first was the extrusion of inexpensive thermoplastic resins into sheets of good dimensional stability. The second was the shaping of the thermoplastic sheets by a low-pressure or vacuum-forming technique.

In investigating the various forming techniques, one should consider not only the economic factors but also the effect of the forming operation on the physical properties of the thermoplastic article. The sheets are generally stretched and oriented during the forming operation. Since orientation is distinct at a low temperature and degradation may occur at elevated temperatures, an optimum forming temperature must be maintained. The objective of a series of experiments was to establish the optimum forming temperature and to study the effect of stretching on the properties of the sheet.

Unidirectional Stretching

It is desirable that stretching be uniform in all directions. For specially shaped articles, however, this may be extremely difficult or impossible. The extreme would be stretching in one direction only, and would cause the greatest changes in the mechanical properties due to orientation.

A high-impact styrene sheet was chosen as a representative of a low-cost, rigid plastic sheeting for these experiments. It was heated to the optimum forming temperature of 170 to 190° C. and drawn to various extents in a unidirectional stretching device. The effect of the orientation on the mechanical properties was determined by measuring the impact strength in the lengthwise and cross-wise directions. The slope of the two curves (Fig. 1) indicates that the impact strength increased slightly in the direction of draw but decreased more in the cross-wise di-

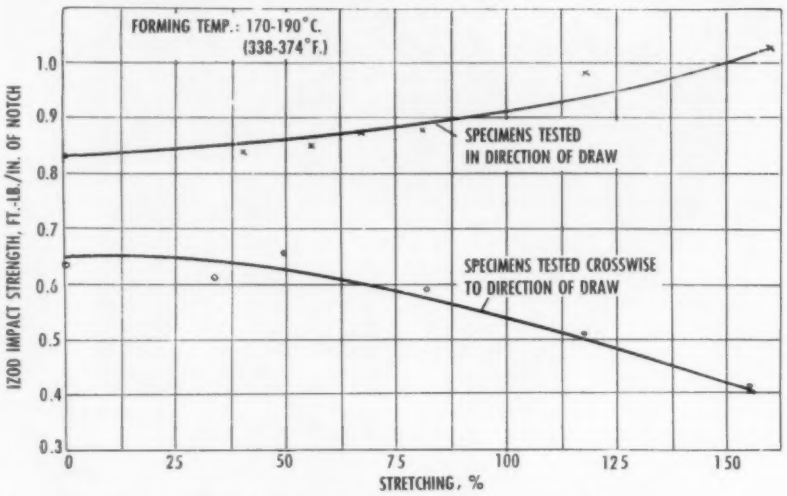
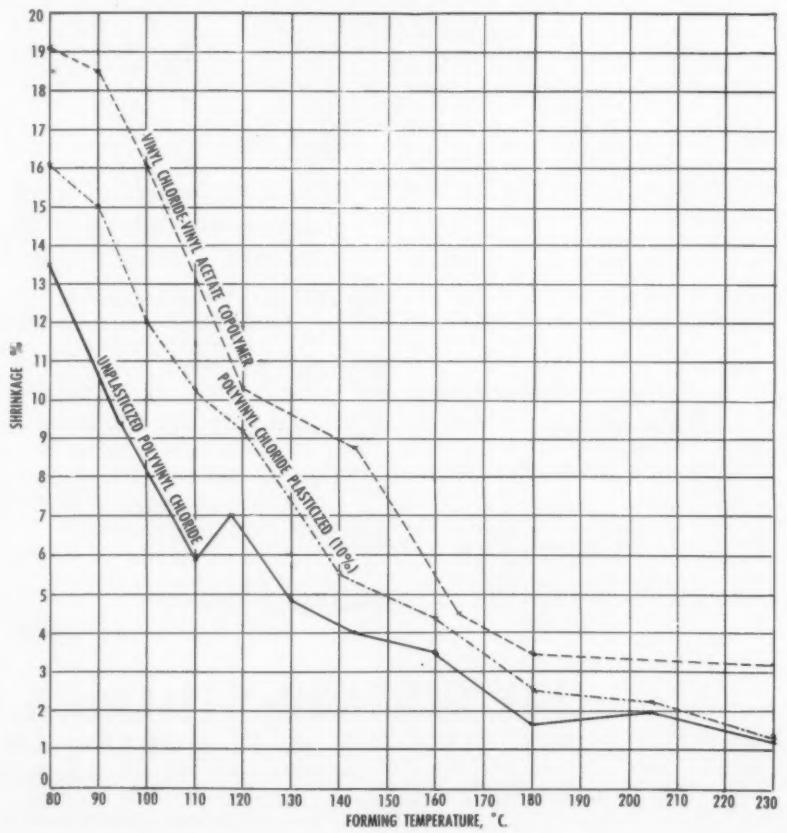


Fig. 1 (above)—Unidirectional stretching vs. impact strength for high-impact styrene

Fig. 2 (below)—Shrinkage of rigid sheets drawn 20 to 25%, aged for 100 hr. at 165° F.



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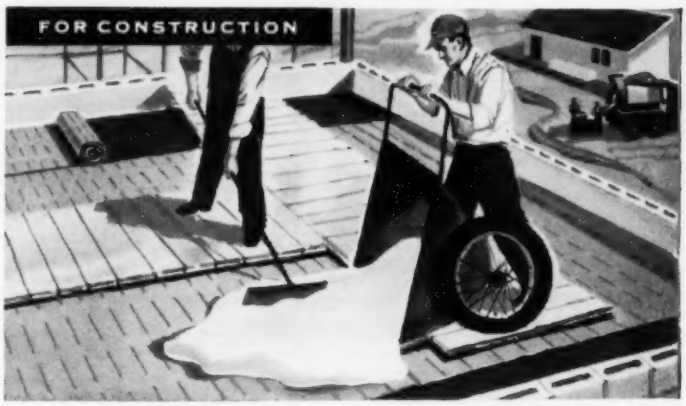

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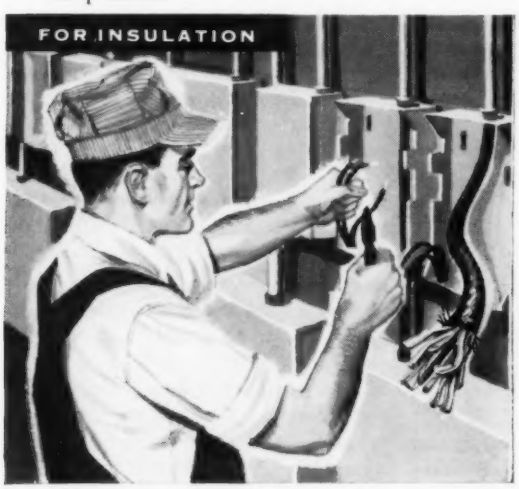

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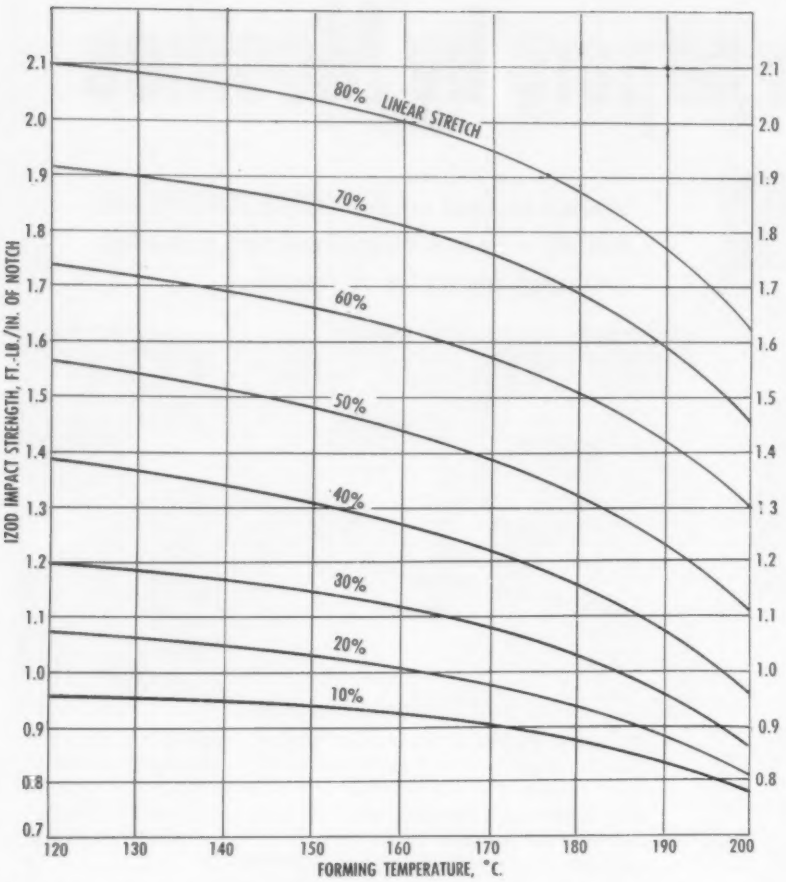

Fig. 3—Respective Izod impact strengths of high-impact polystyrene sheets drawn in two directions at different temperatures and at different stretching ratios

rection. These curves describe the effect of orientation under nearly optimum conditions. The difference was more distinct at lower forming temperatures and in sheets of the elastomeric type, such as styrene-acrylonitrile polyblends and vinyls.

In most forming operations, the average draw is less than 60%, and the difference between draws in biaxial stretching is less than 30 percent. Therefore, no large directional differences in the mechanical properties can be expected in a high-impact styrene sheet drawn at the correct forming temperature.

Biaxial Stretching

The biaxial stretching of polystyrene[1] and acrylic[2] sheets has been described in the literature. It is customary to define biaxial stretching as a percentage increase in linear directions rather than as an area increase. A correlation between the thinning out of the sheet during the drawing or blowing operation and the biaxial stretching, is calculated from the following formula:

$$\text{Final thickness} = \frac{\text{initial thickness}}{\left(\frac{\%\ \text{lengthwise increase}}{100} + 1\right)\left(\frac{\%\ \text{crosswise increase}}{100} + 1\right)}$$

A series of experiments was carried out to establish the optimum forming conditions and to study the influence of the biaxial stretching on the mechanical and thermal properties, employing high-impact styrene sheets, vinyl sheets, and styrene-acrylonitrile polyblends sheets. The linear stretching was determined by printing a square pattern subdivided into ⅛- by ⅛-in. squares over the total surface to be drawn, and measuring the size of the expanded squares. The sheets were heated on one side to the required forming temperature by infra-red radiant panel heaters. The actual forming temperature was determined by imbedding thermocouples into the sheet surface. The heated sheets were stretched 5 to 90% by standard vacuum-forming.

Rigid Vinyl Sheeting

The experiments indicated that rigid vinyl sheets could be drawn over a wide temperature range (80 to 230° C.) when being stretched to the extent of 5 to 25%, but are heat sensitive at higher percentages of stretching. Either the draws are incomplete at too low a forming temperature, or holes are torn when the temperature is too high.

The dimensional stability of the drawn sheets was determined after 100 hr. exposure at 74° C. Figure 2, p. 144, shows that highest shrinkage is at lowest forming temperature and that the shrinkage decreases with increasing forming temperature. The unplasticized polyvinyl chloride sheets shrunk less than unplasticized copolymer sheets formed at analogous temperatures.

However, warping went through a peak. After the exposure, sheets which were drawn at a medium forming range warped most, whereas sheets which were drawn at a lower or higher forming temperature bent only slightly or remained flat. This may be explained as follows: The specimens drawn at a low forming temperature, shrink significantly during aging and are, therefore, able to release internal strains which cause the warping. The specimens drawn at a higher forming temperature do not have internal strains and stay flat when aged at an elevated temperature.

These two results indicate that the sheets should be drawn at a high forming temperature in order to obtain low shrinkage and a good dimensional stability. On the other hand, it was observed that sheets that were heated to a high forming temperature in a wide mold sagged through and wrinkled at the edges when drawn. It was observed that unplasticized polyvinyl chloride sheets could be heated up to 180° C. before the formation of wrinkles oc-

[1] J. Bailey, India Rubber World *118*, 225 (May, 1948).
[2] B. M. Axilrod, M. A. Sherman, and I. Wolock, Modern Plastics *30*, 117 (Dec. 1952); *31*, 128 (Sept. 1953).

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PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
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NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability
BARINAC (Barium Ricinoleate)	Stabilizer-lubricant for clears
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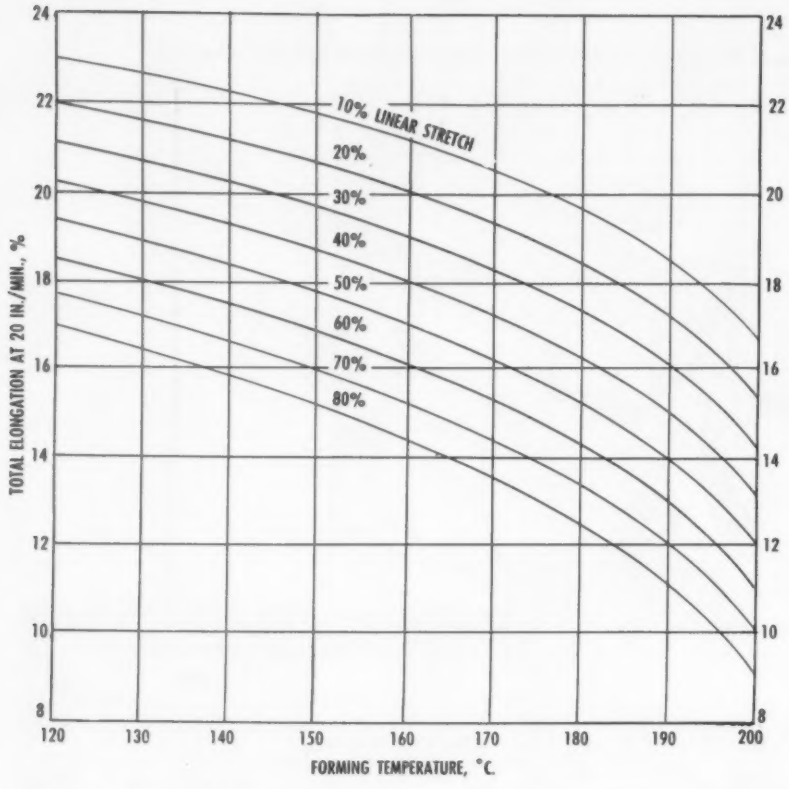


◀ Fig. 4—Total elongation of high-impact styrene sheets drawn in two different directions at different temperatures and stretching ratios

curred; whereas the copolymer sheets showed wrinkles at 160° C. The optimum forming temperature may be considered to be 140 to 180° C. for unplasticized polyvinyl chloride sheets and 140 to 160° C. for unplasticized vinyl chloride-vinyl acetate copolymer sheets.

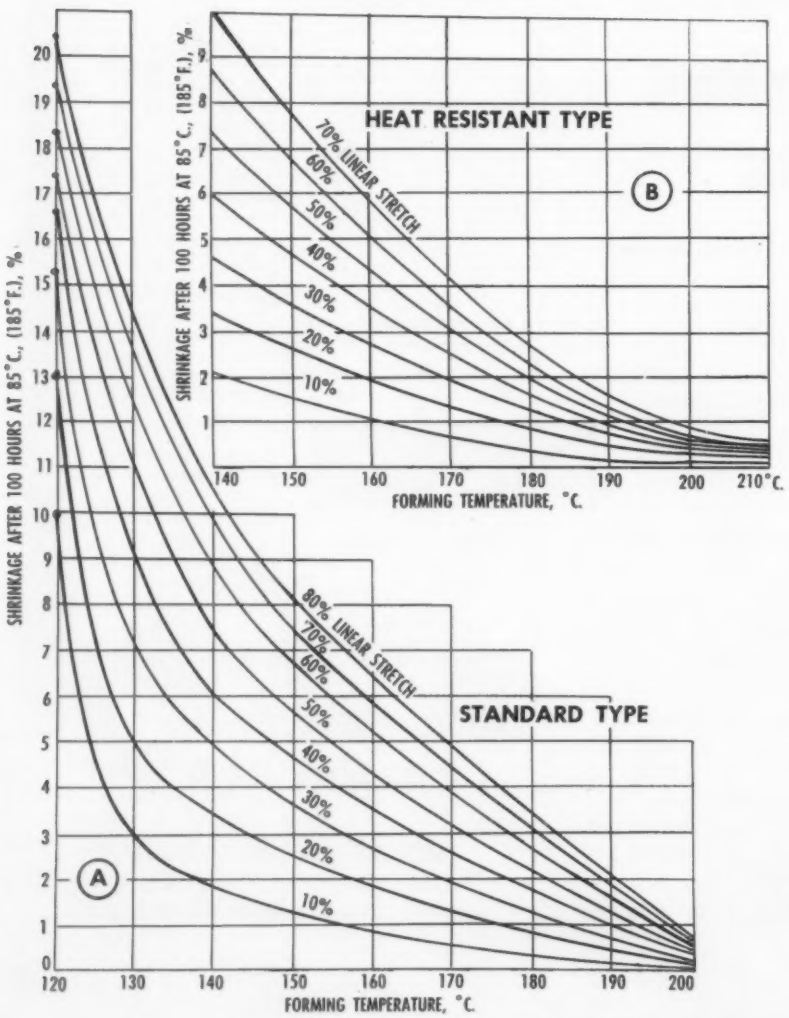
The addition of 5 to 10% plasticizer (e.g., dioctyl phthalate) allows the sheets to be drawn at 70° C., but made the sheets less dimensionally stable (Fig. 2).

High-Impact Styrene Sheeting

The sheets were drawn in a standard vacuum forming machine at different forming temperatures between 120 and 240° C. and to different extents. It was observed that the percentage of draw, as well as the final mechanical and thermal properties were independent of the original degree of orientation of the extruded sheet. The impact strength and tensile properties of the drawn sheets were determined. Figure 3, p. 146, shows that impact strength increases with percentage of draw and decreases with increasing forming temperature. Besides the impact strength, the total elongation at a high testing speed (20 in./min.) was taken as a second measure of toughness of rigid sheeting. Figure 4 shows that the total elongation also decreases with increasing forming temperature, but decreases with the percentage of draw due to the higher orientation.

Two types of high-impact styrene plastic were evaluated: standard and heat-resistant. The drawn specimens of the heat-resistant type did not shrink after the exposure at 74° C., whereas the specimens of the standard type shrank significantly, as shown in Fig. 5A. For example, the shrinkage was almost 21% at a drawing ratio of 80% and a forming temperature of 120° C., but only 6 to 7% at a forming temperature of 160° C. By increasing the temperature of exposure from 74 to 85° C.,

(*To page* 233)



◀ Fig. 5—Shrinkage of standard (A) and heat-resistant (B) styrene sheet drawn in two directions at different temperatures and stretching ratios

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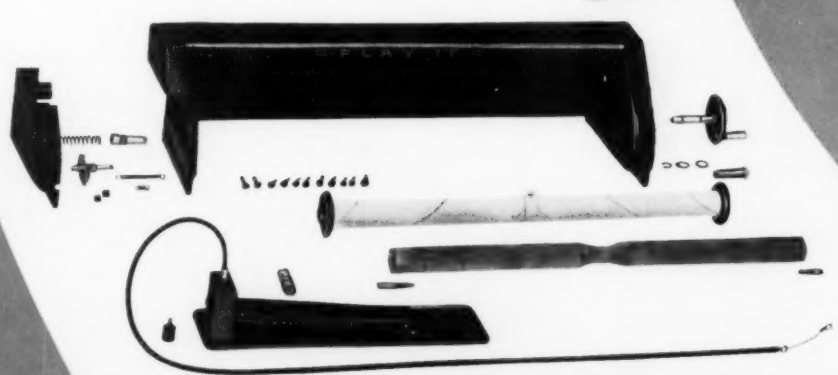

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Creep Properties of Three Plastics*

by WILLIAM N. FINDLEY**

Results of tension creep tests at 77° F. and 50% relative humidity are presented which show the effect of the following variables: 1) the degree of crystallization of polychlorotrifluoroethylene (Kel-F); 2) residual stresses remaining after fabrication of sheets of polyvinyl chloride; and 3) aging of grade-C canvas laminate at 77° F. and 50% relative humidity. The Kel-F was tested in the amorphous, fully crystalline, and intermediate (commercial) states. The effect of residual stresses was shown by tests of samples of Geon 404 before and after an anneal at 275° F. which resulted in shrinkage of the material. The canvas laminate was tested in creep before and after aging at constant temperature and humidity of about 10 years.

THE effect of different degrees of crystallinity, residual stress, and aging on creep of materials has not received wide attention. The only work on these topics for plastics which has been reported, as far as is known, is a study of the effect of aging on creep of cellulose acetate (1)[1] and a creep test method for determining the cracking sensitivity of polyethylene polymers (2).

Most engineering materials are, of course, not available with a wide range in degree of crystallinity. Changes in structure with time are found in other engineering materials besides plastics at certain temperatures, such as steels at high temperatures. Residual stresses may be found in many applications of many materials. Usually, residual stresses are relatively low in magnitude at temperatures where creep becomes significant.

Materials and Procedures

The effect of residual stresses in plastics has often been observed. Means of reducing these stresses and the theory and measurement of residual stresses for plastics have been considered by some investigators. Crazing of plastics has been the subject of several investigations. For linear polymers, crazing has been described as a mechanical separation of polymer chains or groups of chains under the action of tensile stress, and starts in a region where the polymer chains are oriented at right angles to the tensile stress. References to these topics are given in a review article (3).

Polymonochlorotrifluoroethylene (Kel-F) of grade 300 was obtained in sheets ⅛ in. thick from The M. W. Kellogg Co. This grade was unplasticized and represents the highest molecular weight available in the form of molding powder. The high-density molding powder had a compression ratio of 2 to 1. The sheets were compression molded under a pressure of 2500 to 3000 p.s.i. and at a temperature of 480 to 500° F. Immediately after pressing, a sheet was quenched in water to produce the amorphous sample. Another sample was cooled between platens that had cold water circulating through them to produce the material with intermediate crystallinity (commercial practice). The crystalline form was obtained after pressing by dropping the temperature quickly by means of steam to 450° F., then cooling to room temperature in the press. It required 6 to 8 hr. to cool.

The grade-C canvas laminate employed in these tests was the same from which test specimens were obtained for previous tests (4). A

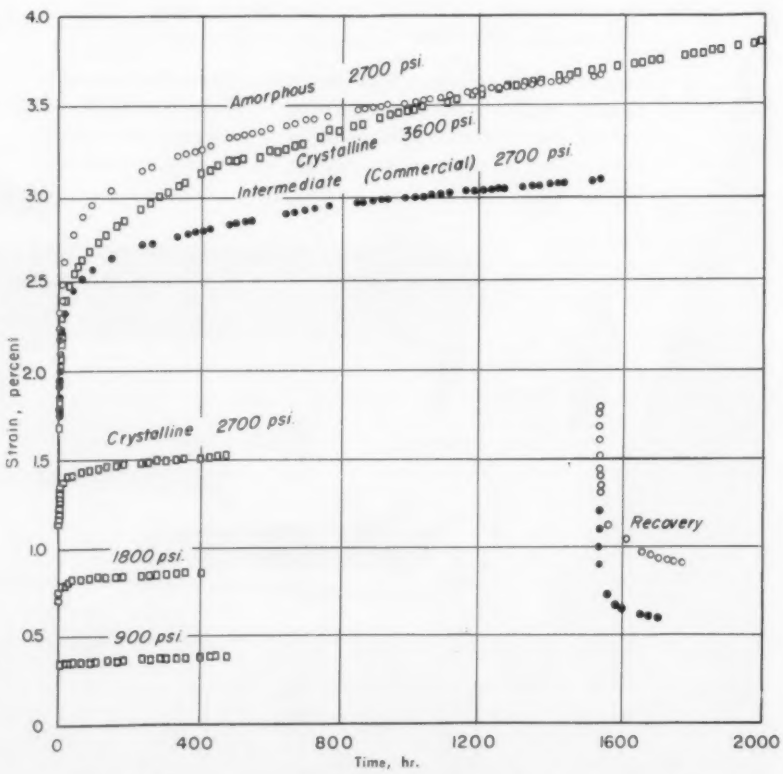
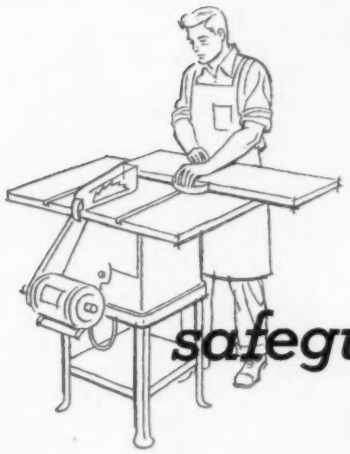


Fig. 1—Creep curves for Kel-F at different stresses and three different degrees of crystallization at a temperature of 77° F. and a relative humidity of 55 percent

* Paper presented at the 1954 Annual Meeting of the American Society for Testing Materials in Chicago, and scheduled for publication in the 1954 A.S.T.M. Proceedings.

** Brown University, Providence, R. I.

[1] Numbers in parentheses refer to references at end of article, p. 235.



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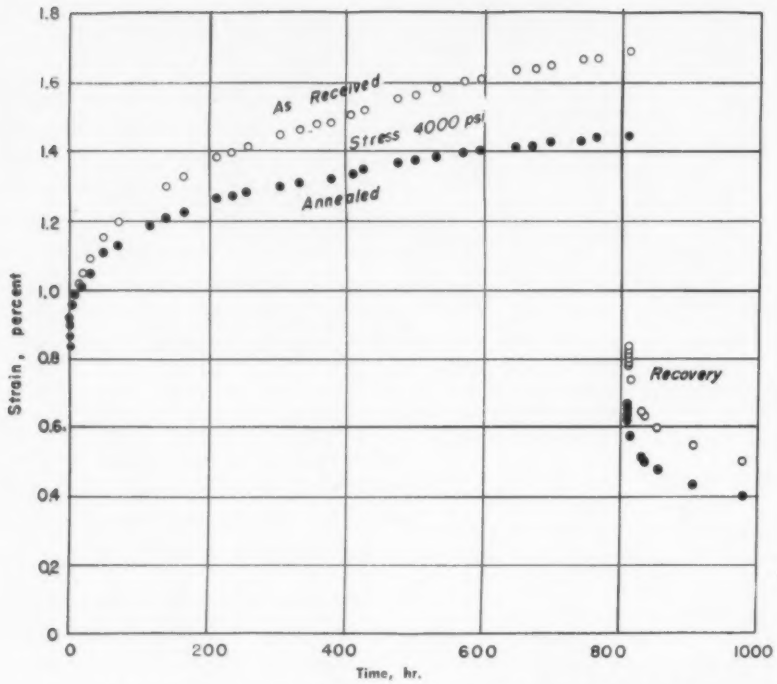
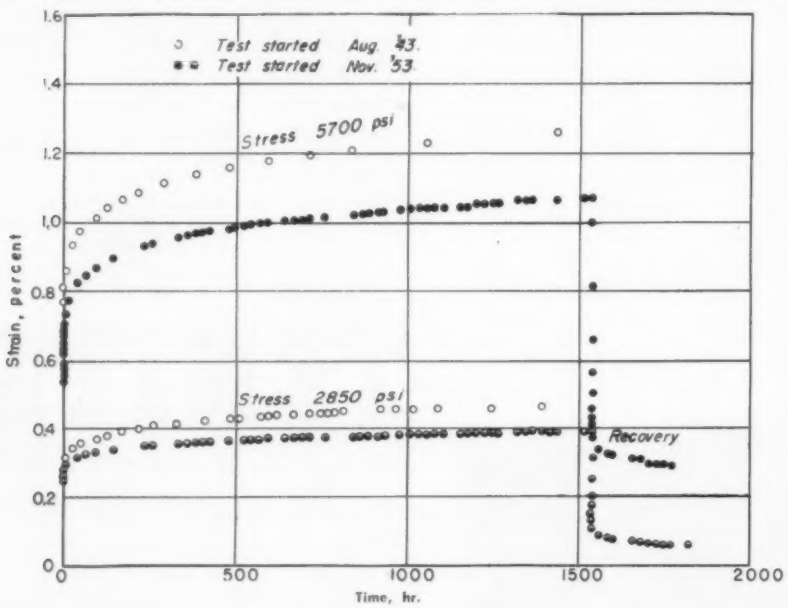


Fig. 2 (above)—Creep curves for Geon 404 before and after annealing operations to remove residual stresses. Tests were conducted at 77° F. and 55% relative humidity

Fig. 3 (below)—Creep curves for Grade C canvas laminate at 77° F. and 55% relative humidity



detailed description of the material is given in reference (4).

The polyvinyl chloride (Geon 404) was obtained as a sheet 9/16 in. thick from Nixon Nitration Works. The formulation was designated VX-108 Natural and contained no plasticizer, 3.3% dibutyl-tin diborate as a stabilizer, and 0.5% stearic acid as a lubricant. The ingredients were blended at 280° F. and calendered into sheets 0.02 in. thick on rolls having a temperature of 300° F. About 28 of these sheets were laminated together in a hydraulic press to form the final sheet and to remove most of the residual strain resulting from the calendering. The sheets were subjected to a pressure of 280 p.s.i. at 315° F. for about 30 min. and then cooled rapidly in the press.

The specimens and procedure employed for the creep tests were the same as previously described (4) except that the specimens for creep tests of Kel-F and Geon 404 had 4-in. gage lengths and the specimens of Kel-F were the thickness of the sheet instead of 1/32 in. thick.

Creep of Polychlorotrifluoroethylene

Figure 1, p. 150, shows the results of creep tests of Kel-F in three different degrees of crystallization. It was observed that the greatest creep occurred in the amorphous state and the least in the crystalline state. Both the time-independent (elastic) strains and creep strains were much larger in the amorphous material. The total strain at a stress of 2700 p.s.i. after 500 hr. under a constant load was 3.3, 2.8, and 1.5% respectively, for the amorphous, intermediate, and crystalline materials. Recovery following creep of the amorphous and intermediate samples is also shown in Fig. 1.

Creep of the crystalline material is shown for four different stresses in Fig. 1. It was observed that creep at the stress of 3600 p.s.i. was much greater than would be expected from the creep of the crystalline material at lower stresses. Examination of the specimens disclosed that crazing occurred in the crystalline material at the stress of 3600 p.s.i. It is not known whether crazing occurred at the lower stresses.

This suggests that the larger creep in the sample tested at 3600 p.s.i. was probably due to the combination of crazing plus creep. In order to determine at what stress crazing started in the crystalline material, a creep test was performed in which the stress was increased at intervals from 1610 to 1910 to 2210 to 2510 p.s.i. It was found that no crazing occurred until about 19 hr. after the load was increased to 2210 p.s.i. At this time the strain increased from 1.06 to 1.27 percent. From this time on, a count was taken of the number of transverse crazing marks per inch. In 1 in. the number of marks increased in succeeding 24-hr. periods from 7 to 15 to 125 to 130.

Crazing was not observed in the material of intermediate crystallinity, but slight crazing was observed

(To page 234)

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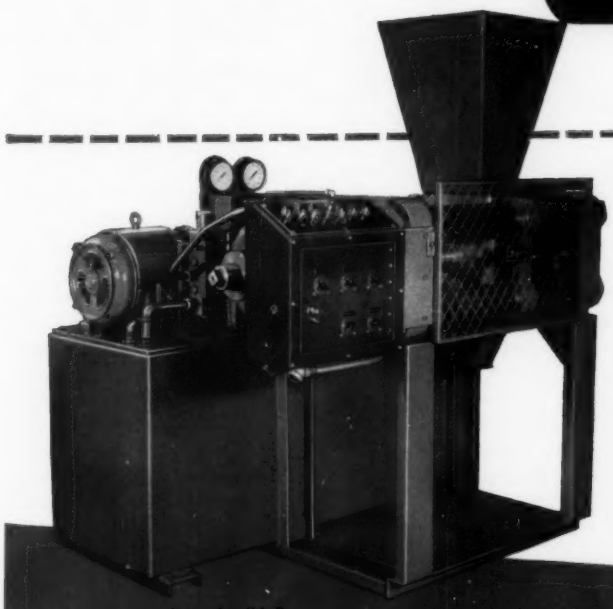

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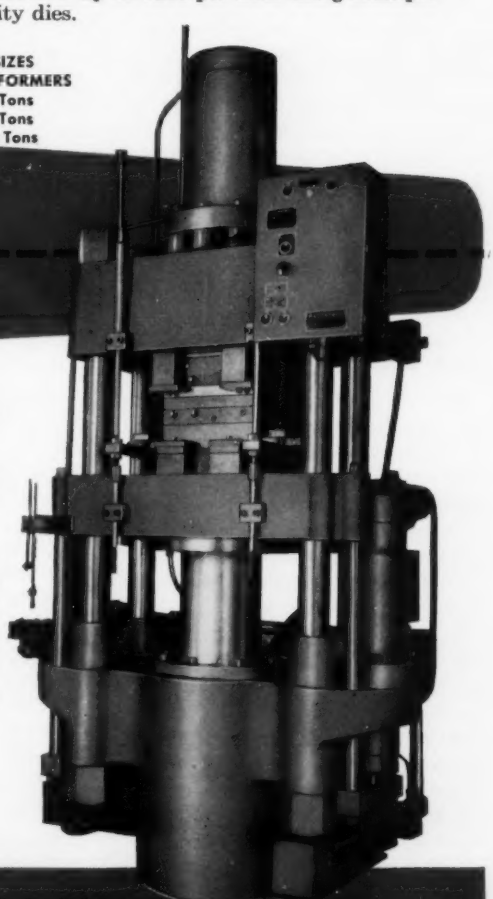

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PLASTICS DIGEST*

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General

EXPORT SECTION. Plastics (London) *19*, 138-59 (May 1954). This issue contains a series of articles reviewing the status of exports insofar as the British Plastics Industry is concerned. A list of British plastics machines reviewed in recent years is presented with the references. A series of comments on the export situation by a number of companies in the plastics industry is presented, summarizing their experiences in the export field. Types of problems to be met in selling to overseas markets and ways of overcoming these are described, using as an example a molded electric switch sold in Canada. Some of the problems encountered in establishing an export section are reviewed and the export situation with regard to thermoplastic materials is discussed. Import and export figures for the British Plastics Industry are presented, as well as a short review of the work of the Export Services Branch of the Board of Trade.

NEW PLASTICS PRODUCTS AT THE B.I.F. Brit. Plastics *27*, 194-205 (June 1954). Over 50 new plastics products were displayed at the British Industries Fair. There was a wide range of household goods made of polyethylene. Polystyrene was not in evidence as much as might have been expected; there were, however, a large number of polystyrene toys and some non-consumer items such as refrigerator components and moldings for radio and TV industries. Polyvinyl chloride appeared in garments, as floor covering, extrusions, and rigid sheets for chemical plant. Glass-reinforced material showed its versatility in several applications, including some mass production items. Among interesting nylon moldings were hingeless sunglass frames. Cellulose acetate appeared in a number of high class toys, as well as in a few semi-industrial products. A striking new application for one material, melamine, was the molding of heads for bath and toilet valves.

NEW CHANCE FOR GLASS-IN-PLASTIC. Plastics (London) *19*, 206-08 (June 1954). (Reprinted from *Fortune*, April 1954.) The development of the glass-reinforced plastics industry in the U. S. is traced and the problems and status of the industry at present are discussed. One of the major problems is the lack of a mass-production technique, hindering the growth of reinforced plastics in mass-market areas. The real bottle-neck of reinforced plastics, however, is the cure time required for the resin. A price war among resin makers is making it difficult for them to support a much needed reinforced plastic research program.

Materials

DEVELOPMENTS IN SILICONES. T. A. Kauppi. Industrial Laboratories *5*, 6-9 (May 1954). The latest developments in the properties and applications of silicones are presented. These include: a wire coating with the same life expectancy at 200° C. as conventional enamels have at 100° C.; fast curing laminating resins which when laminated with glass fibers retains high physical strength after prolonged aging at 600° F.; new silicone water repellents for textiles; silicone defoamer available in an aerosol dispenser; defoamer for food products; a rigid silicone foam that will withstand 20 hr. at 700° F.; an extremely sensitive silicone adhesive for pressure sensitive tapes; and a silicone for use as a water repellent for masonry.

EMULSION SIZES FOR GLASS FIBERS. P. R. Masek. Brit. Plastics *27*, 142-43 (Apr. 1954). The role of textile size in glass fiber polyester laminates is discussed. The effect of two polyvinyl alcohol sizing emulsions on the properties and qualities of the glass fiber and final laminate is reported. A considerable improvement is achieved in the properties of the fabric and of the laminate by the introduction of an amino resinous polymer in one of the sizing emulsions.

ALKYD MOLDING MATERIALS. C. A. Redfarn. Brit. Plastics *27*, 131-33 (Apr. 1954). There are two principal types of thermosetting alkyd resins. One type, known as polyester resin, contains reactive double bonds; the cross-linking reaction is thus effected by addition polymerization, so that no volatile products are given off. These alkyds thus consist of linear polymers made from a saturated dibasic acid, an unsaturated dibasic acid, and a glycol with an etheroid monomer as the cross-linking agent. The other industrially important type of thermosetting alkyd is made by polymerizing the ester of allyl alcohol and a polybasic acid. This is used for molding material, whereas the polyester laminating resins are not suitable for molding material production. The alkyd molding materials are characterized by their extreme rapidity and completeness of cure. They cure at three times the speed of phenolics and give off no volatile matter during the cure. Further details of molding technique are discussed. The rapid cure of the alkyd materials makes them cheaper to use even at double the cost of phenolic materials, provided that the proper molding equipment is used. Given the right equipment, i.e., lightly constructed, fast moving, inexpensive presses; lightly constructed, inexpensive molds; and simple direct heating equipment, the use of alkyd molding materials could provide a major revolution in molding.

PREPARATION OF POLYMERS FROM DIISOCYANATES AND POLYOLS. H. L. Heiss, J. H. Saunders, M. R. Morris, B. R. Davis, and E. E. Hardy. Ind. Eng. Chem. *46*, 1498-1503 (July 1954). The reactions of a 100% excess of diisocyanates with various glycols and polyols, and subsequent curing with water, were studied to determine the usefulness of the resulting polymers in the plastics field. Very promising polyurethane-ureas were prepared from 2,4-tolylene diisocyanate or 4,4′-diphenylmethane diisocyanate and a large number of polyols. The adhesion to metals, glass, and several plastics was good;

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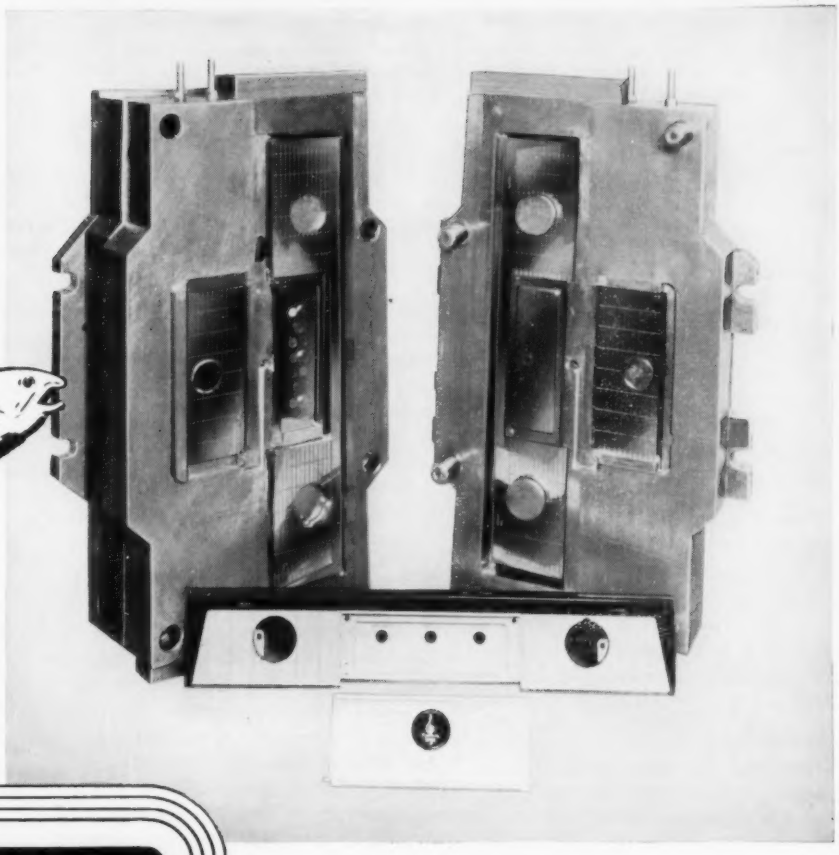

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film properties could be varied over a wide range, depending on the type of polyol used. The polymers could also be used to prepare foamed resins. Preliminary work indicates that diisocyanate-glycol reaction products, like the diisocyanate-modified polyesters, may be valuable in adhesives, coatings, films, and foams.

THREE NEW SILICONE LAMINATING RESINS. Materials & Methods *40*, 98-100 (July 1954). The properties of three new silicone resins for making glass fiber laminates are reported. These products are outstanding in heat, moisture, and chemical resistance. They have good strength properties at both low and elevated temperatures.

CARBOXYMETHYLCELLULOSE. R. H. Jenkins, Jr. Chem. Eng. News *32*, 3310-12 (Aug. 16, 1954). The production, applications, and economics of carboxymethylcellulose are reviewed and compared with other water-soluble film-forming polymers.

POLYESTER RESIN-GLASS FIBER LAMINATES. J. Bjorksten, L. L. Yaeger, and J. E. Henning. Ind. Eng. Chem. *46*, 1632-35 (Aug. 1954). Glass fiber reinforced polyester laminates are considered with respect to the bond between the two components. The effects of moisture and several mechanical and chemical treatments on this bond are briefly discussed. One silane bonding agent is treated in detail, and experimental evidence substantiates an existing theory that explains how this compound aids adhesion between glass fibers and a polyester resin.

Molding and Fabricating

PROGRESS IN PLASTICS SHEET WELDING. E. C. Stanley and H. R. Stilton. Plastics (London) *19*, 72-75 (Mar. 1954). Some new applications of the welding technique to polyvinyl chloride sheeting are described, and some trends in the design of welding equipment and welding tools are discussed. Polyvinyl chloride joined by the radio frequency welding technique is being used for items such as wallets and purses, inflatable toys, automobile upholstery and floor mats, is competing with heat-sealed polyethylene for packaging, and has recently been adopted for heavy-duty garments. The rapid growth of the number of radio frequency welding applications has been made possible by improvements in the design of welding machines and the electrodes and welder tools. With the greatly increased range of machine types produced today, it is necessary to choose a machine carefully to suit the anticipated range of products. The "tear-seal" welding method is described, in which the "tear-seal" electrode is encouraged to sink sufficiently deeply into the material to allow the surplus to be stripped away after the weld. The patterns are thus cut out at the same time they are being welded, eliminating a pre-cutting operation in many cases. Three-dimensional welding is also described, which consists of the use of special electrodes and die-sets for producing purses and the like.

WELDING OF REINFORCEMENTS INTO BOOK COVERS AND SIMILAR ARTICLES. K. Brandenburger. Der Plastverbraucher *5*, 70-72 (Mar. 1954). Polyvinyl chloride is used in increasing amounts in the manufacture of loose leaf binders, book covers, and similar articles. The polyvinyl chloride plastic requires some stiffness which is obtained by welding a piece of cardboard between the two plastic sheets. A detailed account of the welding methods presently used is given.

CONTINUOUS DIP-MOLDING OF PVC CONNECTORS. Brit. Plastics *27*, 92-93 (Mar. 1954). A continuous process is described for producing a flexible polyvinyl chloride lavatory connector by a dip-molding process. The 20 foot-long production line consists of a pre-heating oven, dipping tank, drip box, curing oven, and a water-splash where the moldings are cooled. One operator attends the whole of this production with the exception of trimming.

LIQUID HEAT CARRIERS. L. Walter. Brit. Plastics *27*, 218-20 (June 1954). The requirements of modern processing methods for machinery with more positive and accurate temperature control, which is at the same time reliable and yet flexible, has led to wider use of liquids as heating media. It is claimed that liquid heat carriers as compared with steam or electric heating offer a more uniformly heated surface, give a full-range heating and cooling performance over wide temperature ranges, and allow quick-response temperature regulation. A table listing recommended operating temperatures for various liquid heat carriers is presented. Diagrams are shown of liquid heating and cooling systems for calenders and for presses. The application of liquid heating system to calenders, extruders, and injection and compression presses is discussed.

PLASTIC EMBEDDED MINIATURE UNIT CIRCUITS. W. A. Ernst. Materials & Methods *40*, 90-91 (July 1954). A process is described for embedding miniature electronic circuitry and devices in plastics. The parts are encapsulated in a piece of silicone rubber and placed in a polyvinyl chloride plastic mold, and a liquid polyester containing catalyst and silica filler is poured over the wrapped part. The polyester is cured at room temperature.

CONVEYORIZED ASSEMBLY FOR COMPONENT EMBEDMENT. J. C. Souter. Elec. Mfg. *54*, 89-93 (Aug. 1954). An automatic conveyorized system is described for casting transformers and other components in epoxy and polyester resins. Consideration is also given to dip-coating methods that utilize the conveyorized assembly for impregnating coils. The conveyorized system is synchronized to meet time-cycle requirements, including resin mix, filling, setting, and cure.

Applications

AGGREGATION OF SUSPENSIONS BY POLYELECTROLYTES. A. S. Michaels. Ind. Eng. Chem. *46*, 1485-90 (July 1954). The mechanism of action of polyelectrolytes in aiding the flocculation of aqueous suspensions of finely divided solids was investigated. Acrylamide was polymerized in aqueous solution by redox catalysis to yield two polymers of different molecular weights. Each polymer was then subjected to caustic hydrolysis varying between 0 and 100%, and the resultant compounds were evaluated as to their flocculating effectiveness in aqueous suspensions of two natural soils, as measured by changes in the bulk density of the soils after sedimentation. For both soils, maximum flocculation occurs with acrylamids hydrolyzed to between 28 and 35%, and the polymer of higher molecular weight is more effective. The optimum polymer con-

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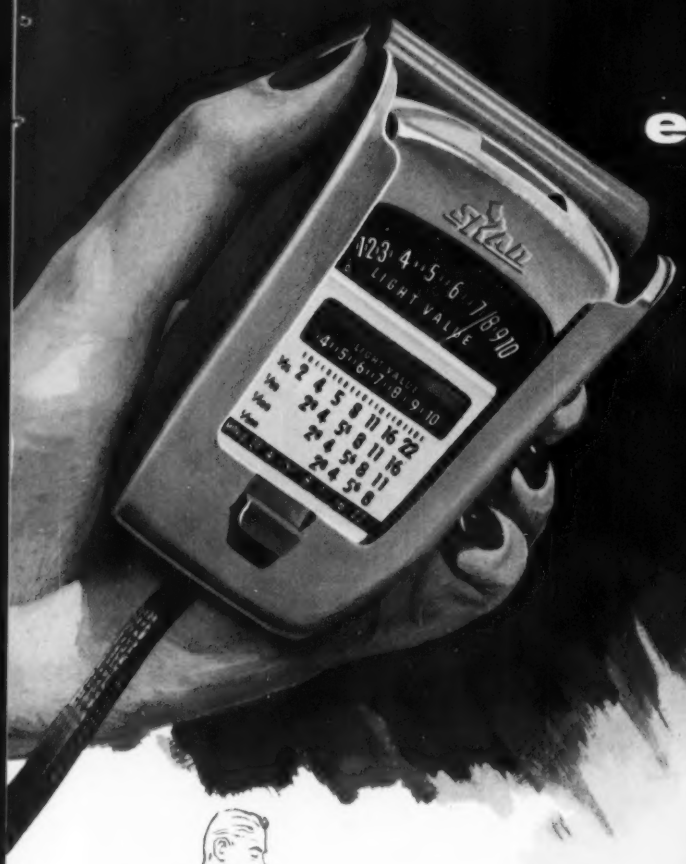

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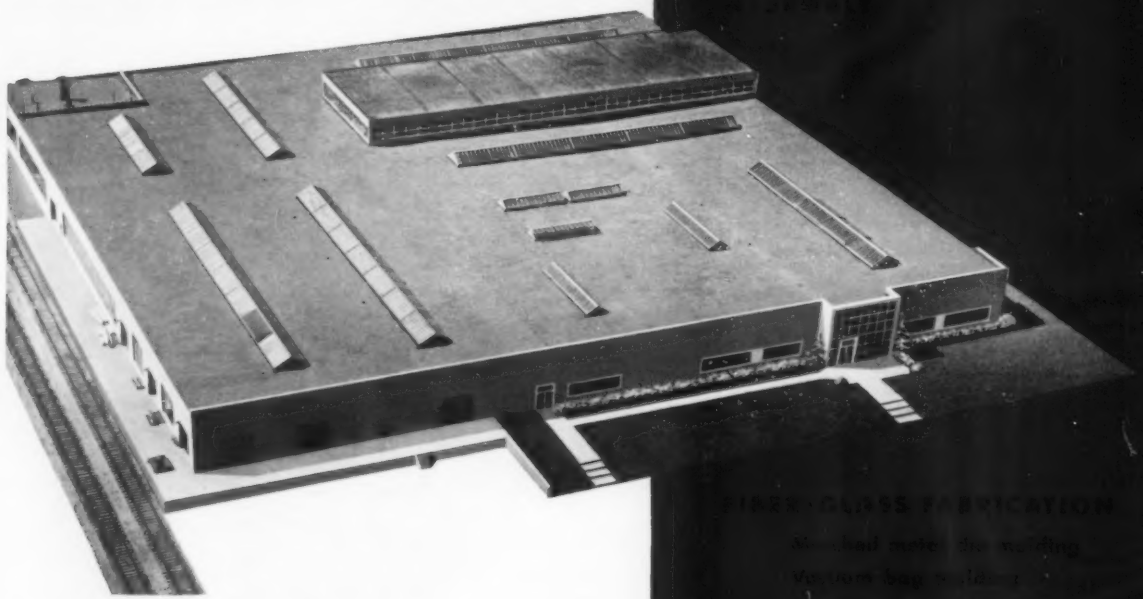

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centration for maximum flocculation varies in no consistent fashion with molecular weight and degree of hydrolysis. Analysis of these results, combined with previous information, has led to the formation of a hypothesis for the flocculation mechanism: that aggregating polymers act by adsorbing on and bridging between suspended solid particles, the adsorption occurring by hydrogen bonding or ester formation between hydroxyl, unionized carboxyl, or amide groups on the polymer and hydroxyl groups on the hydrated solid surfaces. The sole function of ionic groups on polyelectrolytic aggregants is to cause extension of the polymer chains in solution and facilitate interparticle and interchain association.

DESIGNING FABRICATED NYLON PARTS. R. B. Zimmerli. Machine Design *26*, 153-59 (Mar. 1954). Machining and stamping of parts from stock nylon shapes and the properties of nylon are discussed. The properties that are particularly useful in design requirements are wear and abrasion resistance, low coefficient of dry friction, resilience, light weight, corrosion resistance, and ease of fabrication. The properties are considered in relation to design requirements.

BUSINESS MACHINE HOUSINGS FROM GLASS-REINFORCED POLYESTERS. B. W. Nelson. Elec. Mfg. *54*, 94-6 (Aug. 1954). The design and production arguments for changeover from aluminum castings to glass-polyester moldings are given. The changeover resulted in a 30% cost reduction on overall finished parts and a 40% saving in weight. Strength design must take into account the fact that although glass-fiber-reinforced polyester is stronger than steel on a weight basis, this is not true on a volume basis. The polyester material requires a thickness about three times greater than that of steel to give the same rigidity.

RUSSIAN PRACTICE FOR CONNECTING VINYL HOSE. Brit. Plastics *27*, 188 (May 1954). Diagrams are presented of five types of joints for vinyl hose used in Russia.

VACUUM FORMING OF BRAILLE LITERATURE. Brit. Plastics *27*, 224 (June 1954). Braille literature and highly detailed relief maps can be produced on flexible cellulose acetate sheet in

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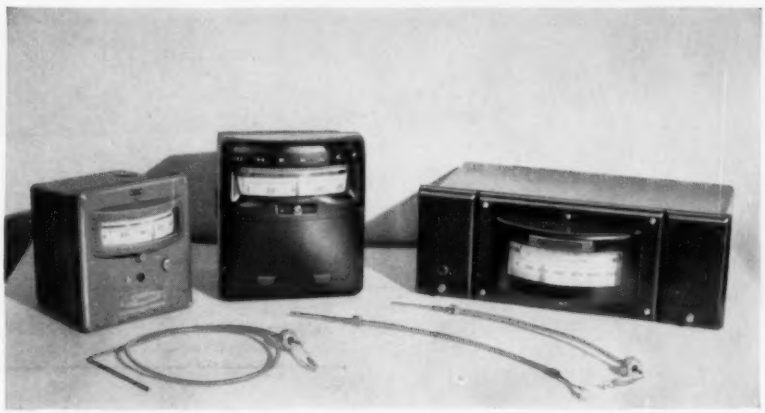

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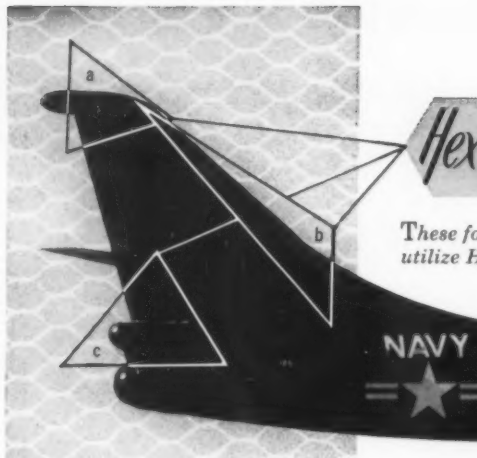

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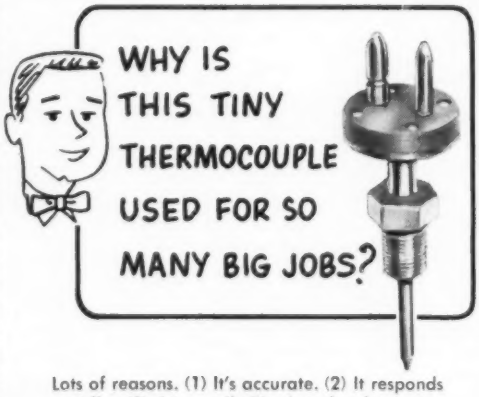

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a new vacuum-forming process. With this process, volumes with restricted appeal for which there is only a small demand and for which the cost of production would be prohibitive can be produced with comparative ease.

MECHANICAL HEART-LUNG USES PLASTICS. Plastics (London) *19*, 213-14 (July 1954). The operation of a mechanical heart-lung having several plastic parts is described. Tubing made of polyethylene and of polyvinyl chloride is used extensively. The oxygenator itself is made from a cylinder of polymethyl methacrylate and contains thin annular plates and washers of the same material. Due to the difficulty of sterilizing these thin plates, experiments are now being carried out towards producing a new lung in which these plates and washers are made of polytetrafluoroethylene. Polymethyl methacrylate rod is also used in the fabrication of bubble traps.

SHOCK PROTECTION FOR INSTRUMENT WINDOWS. A. D. Bedrosian. Elec. Mfg. *54*, 102 (Aug. 1954). A Signal Corps sponsored project has developed a window protector for electrical indicating instruments that utilizes hot-drawn, cup-shaped cellulose acetate butyrate sheet, with a buffed graphite treatment to impart anti-electrostatic properties, and a baked melamine coating for abrasion resistance.

COMPARTMENTED BAGS. Modern Packaging *27*, 114-16 (June 1954). Compartmented bags of polyethylene, originated for the silverware industry, are now being used as a method for packaging and protecting miniature switch controls. These bags prevent rust and corrosion, protect each item from mars or scratches, and permit visual identification of each part.

Properties

PLASTIC FILMS AT LOW TEMPERATURES. A. J. Freeman, L. W. Sheridan, and M. M. Renfrew. Modern Packaging *27*, 147-151, 216-217 (June 1954). New data are presented on the toughness and gas-transfer characteristics of plastic films at temperatures down to −75° C. The results indicate that the cold brittleness temperature decreases and puncture resistance increases with

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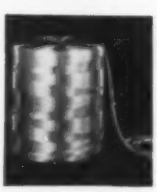

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increasing molecular weight of polyethylene. Blends of polyethylene and polyisobutylene were investigated as possible candidates for balloon films, but proved to be unsuitable because polyisobutylene raised the cold-brittleness temperature markedly. Polychlorotrifluoroethylene, polytetrafluoroethylene, and polyethylene terephthalate films all appear to have good low-temperature toughness. Several laminated plastic films investigated had toughness at low temperatures superior to that of straight polyethylene film. Preliminary data on irradiated polyethylene film indicates that high-intensity radiation increases low temperature puncture and tear strength and lowers the cold-brittleness temperature markedly. The permeability of polyethylene films to various gases decreases rapidly with a decrease in temperature, the relationship being exponential. Molecular weight did not affect the permeability of polyethylene films significantly. Gas porosity through holes was essentially unaffected by temperature.

FUNDAMENTALS OF ELECTRICAL INSULATION. I. CHEMISTRY OF INSULATION. J. Swiss. Westinghouse Eng. *14*, 114-20 (May 1954). II. PHYSICS OF INSULATION. T. W. Dakin. Westinghouse Eng. *14*, 120-24 (May 1954). The physics and chemistry concerned in the insulation characteristics of materials, in particular plastics and resins, is reviewed.

Testing

NEW ADHESION TESTER FOR PLASTIC FILM. W. Voigt. Kunststoffe *44*, 199 (May 1954). A device is described for measuring the adherence of plastic films to each other or to a coating. The jerky motion that is usually encountered in such measurements is eliminated and the stripping force can be measured to 1 gram.

PLASTICIZERS IN VINYL CHLORIDE RESINS. H. M. Quackenbos, Jr., M. C. Reed, H. F. Klemm, and E. F. Schulz. Ind. Eng. Chem. *46*, 1335-49 (June 1954). Plasticized vinyl film and sheeting sometimes harden in service on loss of plasticizer. Attempts are made to explain the mechanism of plasticizer migration and to develop more realistic tests for measuring these effects. New test procedures were developed for the loss of plasticizer into soapy water and into

mineral oil. An apparatus was devised whereby the sample is dragged through absorbent powder. This "rub-off" test of plasticizer loss simulates the treatment that must be withstood by vinyl upholstery. The study of the mechanism shows why results for the soapy water, oil, and rub-off tests are often similar, why loss is proportional to the square root of time, and that, under some conditions, a property of the plasticizer itself, e.g., vapor pressure, governs loss from the plasticized sample. These new test methods are more rapid and more economical to run than older test methods and give more reliable results.

ALKYLATION OF CELLULOSE WITH ESTERS OF *p*-TOLUENESULFONIC ACID. J. W. Weaver, C. A. Mackenzie, and D. A. Shirley, Ind. Eng. Chem. *46*, 1490-93 (July 1954). The topochemical conversion of cellulosic textiles to ethers of cellulose often confers interesting properties. Carboxymethylated fabrics are soluble in alkali, aminoethoxycellulose has the dyeing characteristics of wool, and etherification with the stearamidomethyl group produces a water-repellent textile. Esters of *p*-toluenesulfonic acid have been used as alkylating agents for many types of organic compounds, but the literature contains no information concerning the preparation of ethers of cellulose with these reagents. This preliminary work establishes the optimum conditions for the methylation of cellulose with methyl *p*-toluenesulfonate and the alkylation with other esters under these conditions. The reactivity of the *p*-toluenesulfonates with alkali cellulose was found to diminish as the length of the alkyl group increased. The ethyl and propyl ethers were prepared, but the butyl and phenyl esters were ineffective as etherification agents for cellulose.

ANALYSIS OF ALKYD RESINS MODIFIED WITH VINYL CHLORIDE-ACETATE COPOLYMER. M. H. Swann and G. G. Esposito. Analytical Chem. 25, 1054 (June 1954). A method is described for determining the chlorine content of alkyd resins modified with vinyl chloride-acetate resin. This is also modified to determine the vinyl chloride-acetate content in the modified alkyd resin and the vinyl chloride content in vinyl chloride-acetate.

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U. S. PLASTICS PATENTS

Copies of these patents are available from the U.S. Patent Office, Washington, D.C., at 25¢ each.

RESIN. J. B. Davidson and E. J. Romatowski (to Allied Chemical). U.S. 2,683,134, July 6. Ethylene-polyamine modified urea resins.

COPOLYMERS. N. A. Higgins (to Du Pont). U.S. 2,683,136, July 6. Copolymers of hydroxyacetic acid.

RESINS. H. H. Roth (to Dow). U.S. 2,683,137, July 6. Water-dispersible sulfonates of alkenyl aromatic resins.

RESINS. H. G. Goering and J. P. Rocca (to Standard Oil). U.S. 2,683,-138, July 6. Propylene-isoolefin-cyclic olefin tripolymers.

POLYMERIZATION. E. G. Howard, Jr. (to Du Pont). U.S. 2,683,140, July 6. Polymerization of olefins with vanadous catalyst.

CELLULOSE ESTERS. B. B. White and E. Barbash (to Celanese). U.S. 2,683,143, July 6. Production of cellulose esters.

POLYMERIZATION. W. J. Balon and O. Stallman (to Du Pont). U.S. 2,-683,144, July 6. Polymerization of isocyanates.

SHELL MOLDS. M. F. Drumm and R. R. Cook (to Monsanto). U.S. 2,683,296, July 13. Phenolic resin composition.

BATTERY SEPARATOR. F. Booth (to British Fibrak). U.S. 2,683,400, July 13. Balsa-phenolic resin sheet.

CONDUCTIVE PLASTICS. M. A. Coler. U.S. 2,683,669, July 13. Conductive molding plastic.

RESINS. I. L. Newell and J. K. Atticks (to United Aircraft). U.S. 2,683,697, July 13. Nylon-reinforced copolymer resins.

EMULSIONS. J. H. Bates (to Dow). U.S. 2,683,698, July 13. Stable emulsions of hydrocarbon polymers.

POLYVINYL CHLORIDE. J. Dazzi and J. R. Darby (to Monsanto). U.S. 2,683,701, July 13. Polyvinyl chloride plasticized with a polycarboxylate.

POLYMER. G. E. Ham (to Monsanto). U.S. 2,683,703, July 13. Polymeric N-acrylyl morpholine.

POLYMER. H. D. Anspon (to General Aniline). U.S. 2,683,704-5, July 13. Colorless poly-alpha-chloroacrylate.

RESINS. H. F. Müller (to Institut International Financier of Eschen). U.S. 2,683,706, July 13. Fusible lignin resins.

RESINS. N. V. Seeger and E. E. Fauser (to Goodyear). U.S. 2,683,-730, July 13. Polyisocyanates.

POTTING. R. E. Cunningham (to Melpar). U.S. 2,683,766-7, July 13. Potted electrical circuits.

MOLD. H. F. Reichenbach (to Cresale). U.S. 2,683,899, July 20. Mold for tubular plastic parts.

EXTRUDING. R. W. Lotz (to Apex Electrical). U.S. 2,683,900, July 20. Extruding tubular articles.

COATING. S. R. Prance and H. O. Waag (to General Motors). U.S. 2,684,310, July 20. Acrylic coating for acrylic plastic.

CAPACITOR. J. Burnham (to Sprague Electric). U.S. 2,684,317, July 20. Resin-impregnated capacitor.

PANEL. F. Lyijynen (to Briggs Manufacturing). U.S. 2,684,320, July 20. Laminated trim panel.

FOAM. H. D. Anspon and F. E. Pschorr (to General Aniline). U.S. 2,684,341, July 20. Alpha-chloroacrylic acid ester foam.

VISCOSE TREATMENT. J. K. Dixon and N. T. Woodberry (to American Cyanamid). U.S. 2,684,343, July 20. Adding alkylated polyalkylol melamine to viscose dope.

CORE BINDING. D. S. Phillips (to American Cyanamid). U.S. 2,684,344, July 20. Dicyandiamide.

POLYMER. H. Yuska and J. E. Hanle (to Interchemical). U.S. 2,684,345, July 20. Interpolymerization products of polyalcohol esters with acrylic esters.

TEXTILE TREATMENT. R. F. Nickerson (to Monsanto). U.S. 2,684,346-7, July 20. Methylated melamine resins.

POLYMER. M. A. Dietrich and A. F. Smith (to Du Pont). U.S. 2,684,348, July 20. Compositions containing acrylonitrile.

SILICONE. J. J. Whelton (to General Electric). U.S. 2,684,349, July 20. Flame retardant silicones.

ADHESIVES. G. W. Williams (to U.S. Rubber). U.S. 2,684,350-1, July 20. Composition of phenolic resin, butadiene rubber, and polyvinyl acetal.

RESIN. C. F. Fisk (to U.S. Rubber). U.S. 2,684,352, July 20. High impact composition.

STABILIZERS. F. P. Greenspan and R. J. Gall (to Buffalo Electro-Chemical). U.S. 2,684,353, July 20. Salts of epoxy fatty acids.

COPOLYMERS. W. L. Van Horne, H. T. Neher, and L. N. Bauer (to Rohm and Haas). U.S. 2,684,355, July 20. Copolymers of itaconates and acrylates.

SILOXANES. C. J. Guillissen and A. Gancberg (to Union Chimique Belge). U.S. 2,684,379, July 20. Polysiloxanes.

SHAPING. D. B. Rossheim, S. A. Yaczko, and J. M. Trainor (to M. W. Kellogg). U.S. 2,684,528, July 27. Shaping plastic sheets.

CLEANING. R. G. Swanson (to Owens-Illinois). U.S. 2,684,560, July 27. Cleaning molded articles.

LACQUER. J. S. Tinsley (to Hercules). U.S. 2,684,915-6, July 27. Ethyl cellulose aerosol lacquer.

POLYMERS. W. A. Proell (to Standard Oil). U.S. 2,684,952, July 27. Thiosulfenyl chloride polymers.

COATING. E. K. Stilbert, Jr., I. J. Cummings, and W. B. Guerrant (to Dow). U.S. 2,684,953, July 27. Intumescent coatings.

POLYMERIZATION. J. R. Miller (to B. F. Goodrich). U.S. 2,684,954, July 27. Emulsion polymerization.

PLASTICIZERS. W. S. Knowles and J. Dazzi (to Monsanto). U.S. 2,684,-955, July 27. Aryl alkyl sulfonates.

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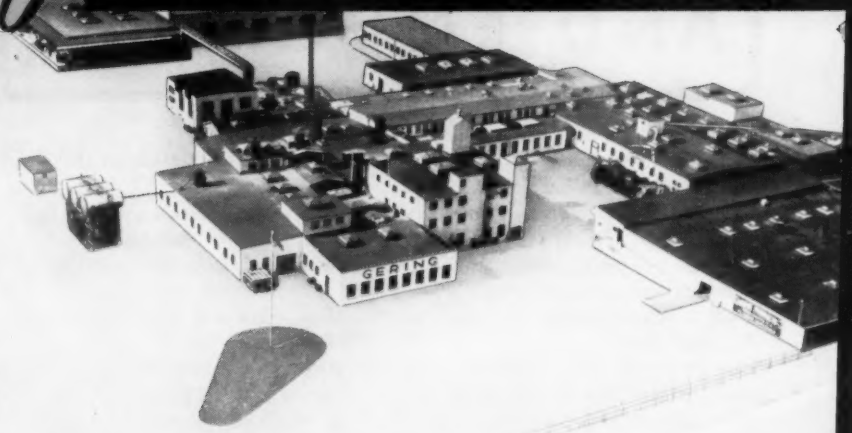

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The center section of the heating cylinder, of one-piece construction, is said to provide direct heat conduction to the torpedo and 75 lb./hr. plasticizing capacity. Proportioning-type temperature controllers are available as optional equipment.

The machine is equipped with the traditional hinged hopper and "lift-out" compensating feed mechanism. The press can be hydraulically retracted from nozzle for purging and injection-end set-ups. Hydraulic-electric interlocked safety doors are provided on the unit.

Specifications of Model 6-200 are as follows:

Injection capacity/shot (oz.)	6
Plasticizing capacity (lb./hr.)	75
Cycles/hr. (dry run)	490 to 650
Max. mold size, hor. (in.)	12 by 24
Max. mold size vert. (in.)	15 by 21
Max. mold thickness (in.)	14
Min. mold thickness (in.)	8
Platen size (in.)	21½ by 24¾
Mold clamping pressure (tons)	200
Mold opens (in.)	6 to 9
Hopper capacity (lb.)	75
Machine size (in.)	180 by 52 by 81

The Fellows Gear Shaper Co., Plastics Machine Div., Springfield, Vt.

Air Presses—Ranging in capacity from ¾ to 2 tons, a series of air presses for use on press-fit assembling, marking, forming, staking, light stamping, and similar operations have a 5-in. side thrust bearing, brass cylinder claimed to be unaffected by moisture in line, a removable base, and a press body of two-piece construction which is said to permit unlimited extension of table-to-ram height. A series of self-aligning sub-presses is optional with the equipment. These sub-presses are reported to permit instant set-ups and set-up changes. Placing the sub-press under the ram of the air press constitutes a complete job set-up, with tools fully aligned.

The air press comes in four models, having cylinders of 4-, 5-, 6-, and 7-in. bores, respectively. *Price Machine Products, 939 W. 80th St., Los Angeles 44, Calif.*

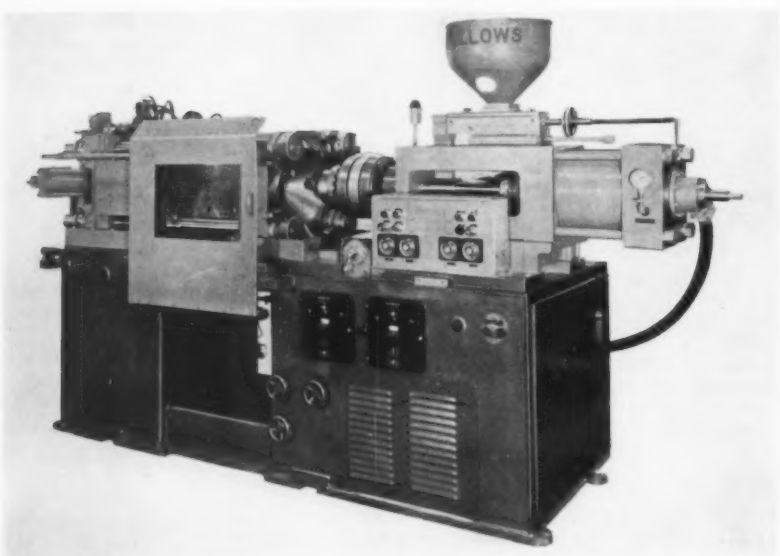
Dielectric Heater—Crystal-controlled r.-f. generator is available in units of 1-, 2-, 3-, and 5-kw. output, for use on automatic machines in plastics sealing, packaging, dehydration, instantaneous drying, and related operations. Because of the crystal control, no deviation from the assigned frequency can take place, eliminating the necessity for all shielding while still complying with all FCC regulations. The electronic circuits are composed of three chassis, each of which may be removed or replaced. The entire unit is housed in a cabinet occupying a floor space 23 by 24 inches. Power is adjustable from zero to full, and is regulated by a single knob mounted on a front panel. A time cycle is also adjustable by a single control from the front panel. *Erdco Engineering Corp., Addison, Ill.*

Valve—Incorporating poppet type seals, a rotary handle action, four-way valve is recommended for use with pressures up to 125 p.s.i.g. air and temperatures up to 175° F. A bottom-ported base plate permits removal of valve body without disturbing piping. *Ross Operating Valve Co., 120 E. Golden Gate Ave., Detroit 3, Mich.*

Vacuum Forming Machines—A line of drape and vacuum forming machines, ranging from a small standard model with a sheet-size capacity of 26 by 38 in. to a unit large enough to accommodate a 54 by 78 in. sheet, has adjustable clamping mechanisms which permit sheets to be formed down to 4 by 4 in. in 1-in. increments.

All important controls are grouped face upward on a horizontal panel at the front of the machine, within easy reach of the operator.

The drape mechanism of the unit has synchronized twin-toggle action. Travel is adjustable from ¼ to 12 in.,



Fellows Gear Shaper's Model 6-200 injection machine operates automatically or semi-automatically

MODEL
H-250

NEW!

VAN DORN
2½ Oz. Automatic Press

Check these outstanding features of this ultra-modern Van Dorn injection press:—

GREATER CAPACITY— Up to 2½ oz.; smaller pieces at faster cycles.

HI-SPEED PERFORMANCE— Plasticizes material at 22 lbs. plus per hour.

FASTER PRODUCTION—Will attain up to 720 cycles per hour (dry run).

HIGHEST EFFICIENCY—Due to water cooling of injection plunger, transfer hopper and oil cooler.

ACCESSIBILITY— Due to simple platen clamp device for purging to change material or color.

MORE SAFETY— Mold hydraulic mechanism makes press non-operative unless molded part is completely ejected.

SIMPLER OPERATION—Due to automatic, adjustable material metering device.

MULTIPLE OPERATIONS—Minimum operator attention by use of larger hopper and light that indicates when press needs attention.

SELECTIVE CONTROL—Merely throw toggle switch to operate press semi-automatically.

DEPENDABILITY— Because of all-steel construction and Van Dorn's established reputation in the plastics machinery field.

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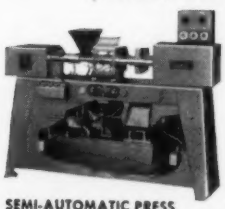
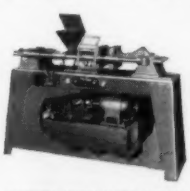
and this Van Dorn model is the lowest priced press in its class!

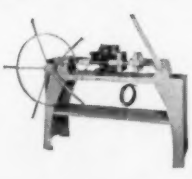
WRITE FOR COMPLETE DATA ON MODEL H-250 AND OTHER EQUIPMENT SHOWN



SEMI-AUTOMATIC PRESS
2-oz. capacity.

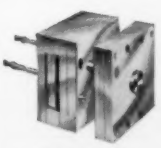


POWER OPERATED, LEVER CONTROLLED PRESSES
2-oz. and 1-oz. models

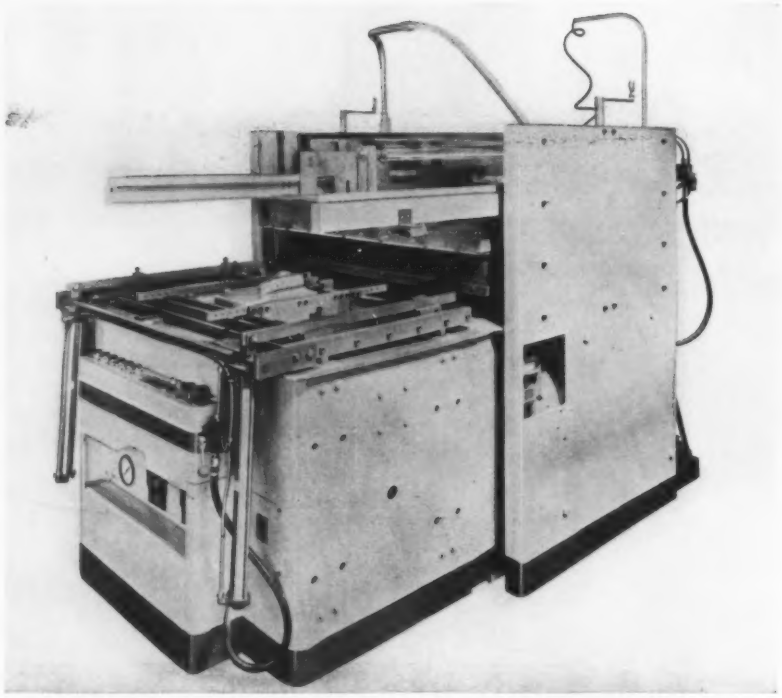


MANUALLY OPERATED PRESS
1-oz. For small jobs, training, etc.

PLASTIC GRINDER
Grinds up rejects, waste, etc., for re-use.



MOLD BASES
Available from stock.



Auto-Vac's line of vacuum forming machines can form sheets as small as 4 by 4 inches

in 1-in. increments, and speed of travel can be regulated to suit the particular material being formed. Temperature is controlled by a Wheelco Capacitrol unit in combination with a thermocouple, with extra heat being provided at the front and end sections. Electrical consumption is claimed to be less than 8 w./sq. in. of heater area.

The units in this line can be operated manually or automatically. *Auto-Vac Co., 2116 Post Rd., Fairfield, Conn.*

Temperature Control—Claimed to maintain heating temperatures at ±0.2° F., an "on-off" temperature control instrument, designated Truetemp Input Controller, can be used with all heating systems, regardless of size, operating temperature, or fuel, provided the present control instrumentation is thermocouple-actuated. The unit is said to counteract the effects of thermal inertia and thus anticipate thermal lag. No motors, cams, or sliding parts are used in the construction.

Two models are available: Model 1700-115, for 115-v. 50/60-cycle lines and Model 1700-230, for 230-v. 50/60-cycle supplies. Both models handle loads of 17 amp. (115 v.) or 8.5 amp. (230 volts). Auxiliary mercury relays are also available for higher load requirements. Outside dimensions are 7 by 10½ by 5 in., weight is 12 pounds. *Winslow Co., 9 Liberty St., Newark 5, N. J.*

Injection Machine—Model 80, a 3/4-oz. high-speed horizontal injection machine is claimed to feed up to 4-oz. shots and operate automatically at up to 780 cycles/hour. Available molding area is over 60 sq. inches.

Model 80 is equipped with the Moslo Radee nickel or stainless steel material cylinder as standard equipment; a special nozzle and screen pack for use with nylon is furnished optionally. An automatic compensating adjustable feed device feeds up to 4 oz. of material. A counter timer is provided for packing the feed cylinder. All hydraulic valves are mounted on a hydraulic manifold, claimed to eliminate up to 60% of the pipe and fitting commonly installed in machines of this kind.

A push-button panel on the machine contains the manual and automatic selector switches, motor start and stop buttons, clamp close and open buttons, and injection button. The unit can be operated manually, semi-automatically, and with continuous automatic repeat operations. *Moslo Machinery Co., 2443 Prospect Ave., Cleveland 15, Ohio.*

Bag Sealer—Model 14-E bag sealer equipment seals flat or gussetted tubing at a rate up to 4000 bags per hour. The unit converts tubing up to 14 in. wide into bags from 1 to 27 in. in length; seal is ⅛ in. wide, clear, and claimed to be burstproof. The knives on the machine are guaranteed by the manufacturer of the equipment for six months of 8-hr./day operation. Tension and unwind control is regulated by use of an electric brake which

(*To page* 172)

Moslo's Model 80 injection machine operates automatically at up to 780 cycles/hour

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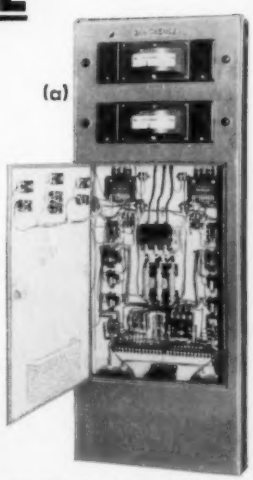
New . . . Entirely Automatic Model "H"

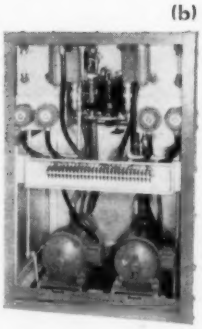
Manufactured under U.S. Pat. #2,632,088, and built to conform to JIC standards.

- **At-A-Glance Supervision with Remote Control Feature**
  Eases the load of supervision. Large distant-view millivoltmeter Pyrometer Scales and Pilot Lights permit instant check on mold operating conditions. Cabinet (a) designed for location with other panel mounted Press Controls.
- **Push Button Start —Completely Automatic Operation**
  One push button starts operation. After fast heat-up, large Wattage Auxiliary Heaters cut out for close control. Automatically adds or drains heat to maintain mold temperatures within ½° F. in range to 250° F.
- **Unequalled Mold Temperature Control Performance**
  Assured by High Velocity-High Capacity circulation, with exclusive patented control features.

(a)



(b)



THERMOLATOR Model H includes Control Cabinet (a); and Operating Unit (b) for permanent installation.

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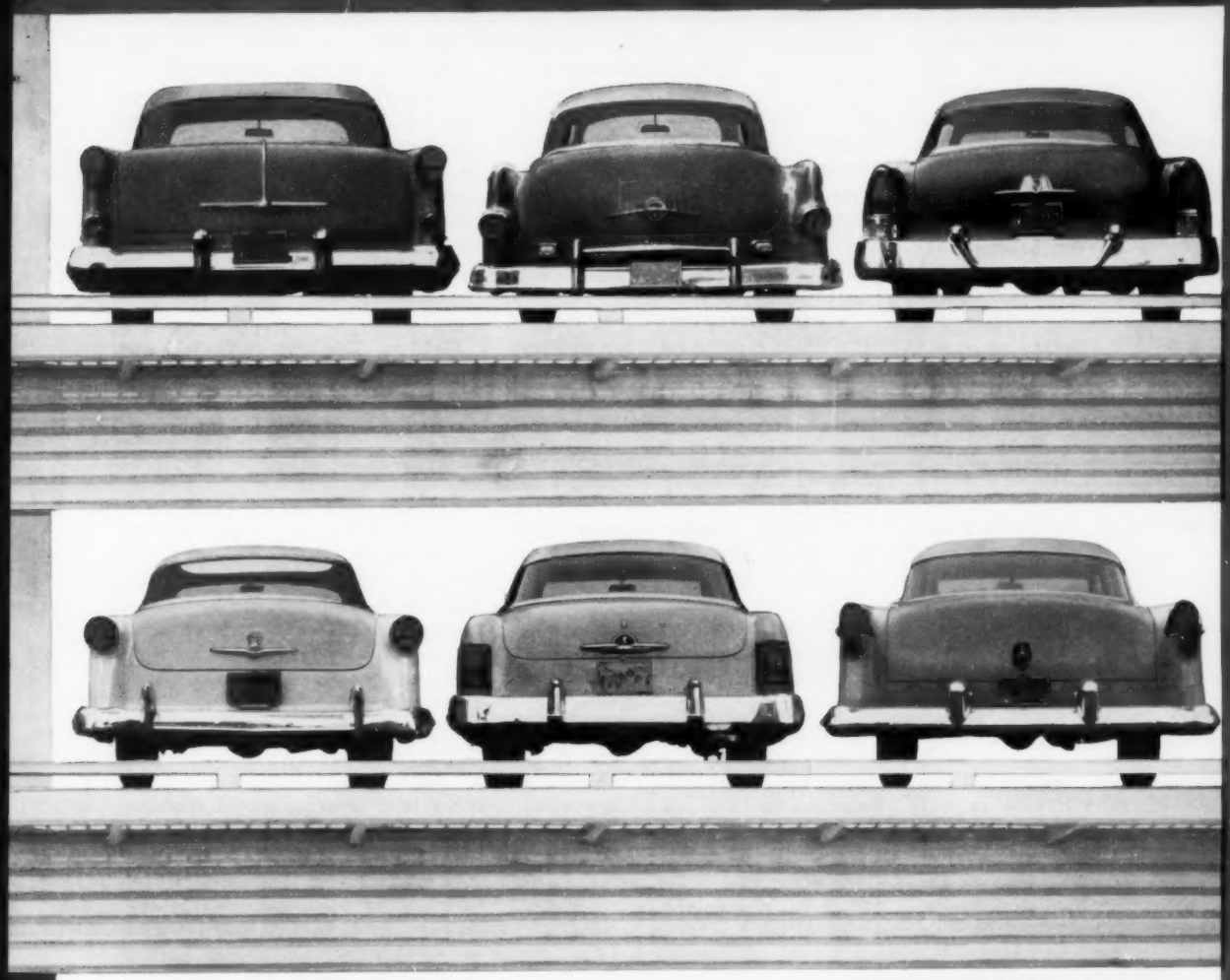
Canadian distributor: *Crystal Glass and Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*



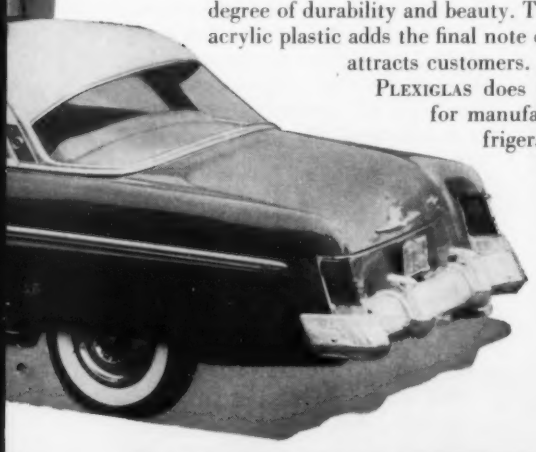
The power to sell is molded in PLEXIGLAS

Car manufacturers use PLEXIGLAS® for tail lights —and nameplates, dials, medallions, transparent roof sections—because they want the highest degree of durability and beauty. They know this acrylic plastic adds the final note of quality that attracts customers.

PLEXIGLAS does the same job for manufacturers of refrigerators, washing machines, air conditioners, radio and television sets. It can be molded accurately into complex shapes. It gives molded parts outstanding resistance to breakage, discoloration and weather. Of all types of plastics, PLEXIGLAS is unsurpassed for attractive appearance.

You can add sales appeal to *your* product with PLEXIGLAS. We will be glad to tell you how.

Our new brochure, "Molding Powder Product Design," will be sent to you promptly on request.



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provides automatic tension control. The seal is made by compression and heat supplied by a thermostatically controlled, low-wattage heating unit. Electric registration controls are available with this model. Model AD is a bench type machine operating on the same principle as Model 14-E. *Hilker Products, 20 W. 22nd St., New York 10, N. Y.*

Control Equipment—Type 12-MC electronic interval timer is designed for use on machines requiring accurate cycling. It is suitable for pushbutton, foot switch, or other actuation of controlled interval operations in spot welding, heat sealing, molding, and others.

The electronic circuit has two cold-cathode tubes, eliminating the necessity of warm-up time. Duration of interval is continuously adjustable from 0.05 to 7 seconds. Output of the circuit is fed into a single-pole, double-throw electromagnetic relay with normally open 10-amp. contacts. Timers designed for intervals below 0.01 sec. are also available. *G. C. Wilson & Co., 1950 Eighth Ave., Huntington, W. Va.*

Vacuum Forming Machine—Model HV-30-60 Hydro Vac vacuum and drape forming machine is claimed to dry-run at 240 cycles/hour. The unit can be operated automatically or semi-automatically and will form sheets up to 27 by 51 in. in size. Maximum depth of draw is 12 inches.

The machine is equipped with a Chromalox strip three bank heater delivering temperatures up to 1150° F.; a Beech-Russ vacuum pump with a 50-gal surge capacity; a 5-gal./min. Vickers hydraulic pump; and an 80-lb. Quincy compressor for air ejection. Separate timers and control unit, hydraulic clamping, and safety screening are also provided. *Vacuum Sales Co., 220 Broadway, Huntington Station, N. Y.*

Injection Accessory—Thermoplastic Pellets Conditioner for use on molding powders, heats molding materials to 100° F. above room temperature and removes all moisture from them, before they enter the injection machine hopper. Pellets to be conditioned are vibrated through an insulated tunnel oven in a thin, free-flowing stream 15 in. wide and 1/16 to 3/8 in. thick.

The conditioner is comprised of the following parts:

Supply hopper—has removable cover, and drops into position from above or may be removed from rear in cases where ceiling is low; insulated transfer container—rests on removable positioning shelf and holds up to 12 lb. of pellets; steel trough—is actuated by a noiseless Syntron pulsating at 3600 vibrations/min.; heaters—eight standard 225-w. flat elements wired for 230-v. supply necessary lampless heat; exhaust—blower of 60-w. capacity pushes air out (optional); gage—doctor blade at rear of trough regulates thickness of flowing stream of pellets.

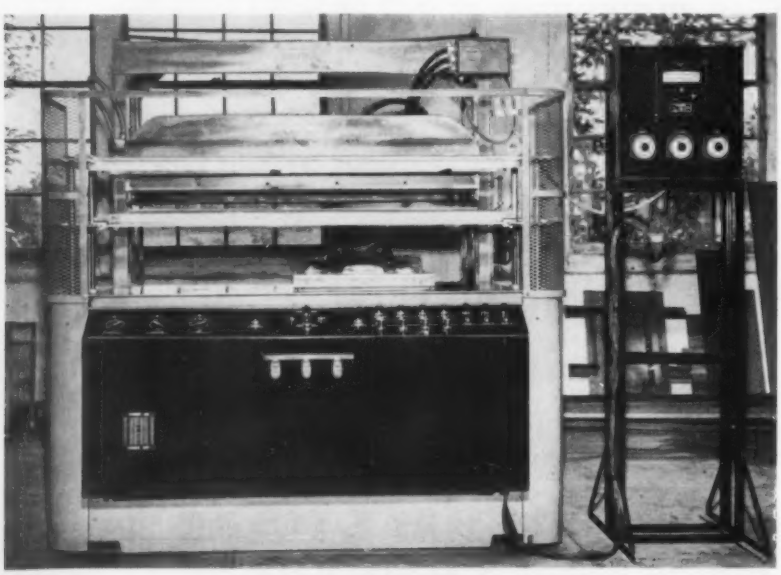
The unit may be attached to the hoppers of most standard injection molding machines, or may be used as a floor model. The unit may also be inter-connected with an injection machine so that heating and operation starts or stops in synchronism with the molding machine. *The Miskella Infra-Red Co., E. 73rd and Grand Aves., Cleveland 4, Ohio.*

Welding Equipment—Model 453 Ectrotherm air press for plastics welding can handle either intricate electrodes up to a platen size of 24 by 30 in., or a bar electrode up to 48 in. long. The moving platen is supported on three guide posts, 120° apart. Both top and bottom platens are fully insulated. A built-in timer has a 0 to 5 sec. scale in 1/10-sec. increments. Firing of the h.-f. generator is controlled by a switch on the press over-travel mechanism; thus r.-f. power can be applied to the electrodes only when they are fully closed. Up and down strokes of the movable platen are controlled by individual solenoid valves. A delay time is available on the upstroke for dwell in the welding position.

Over-all dimensions are 21½ in. deep, 18 in. wide, and 29 in. high; weight is 72 lb.; throat depth is 15½ in.; and daylight opening is 7¾ inches. *Electronic Process Corp., 1170 San Antonio Rd., Los Altos, Calif.*

Inspection Tool—Lightweight, portable Model 60 polariscope finds application in the inspection of plastics products for stresses and strains, for pressures and tensions at weld points, gates, and joints, and for structural quality. In use, the operator holds the specimen being tested in the field of the instrument and views it through the analyzer (or top polarizer). The normal color of the field is deep blue. The degree of color change in brightness and intensity indicates the location and extent of stress and weakness. *Pioneer Scientific Corp., Great Neck, N. Y.*

Drill Units—Model 110 (column-mounted) and Model 111 (pad-mounted) automatic drill heads are



Vacuum Sales' Model HV-30-60 vacuum forming machine dry-runs at 240 cycles/hour

complete units for high-speed production drilling from 0.004- to 0.125-in. diameters (up to ¼-in. dia. for very light materials). Spindle feed and speed are separately controlled for any combination of feed and speed. Spindle travel is powered by an in-line two-way air cylinder; rate of feed is controlled by a closed hydraulic system. A ⅛-hp. electric motor provides stepless direct spindle speed control from 1000 to 10,000 r.p.m. or from 2500 to 15,000 r.p.m. Head is mounted on a wide-face yoke casting and operates in any position. An adjustable mechanical depth stop and dwell period at end of stroke is also available. *The Electro-Mechano Co., 261 E. Erie St., Milwaukee, Wis.*

Hardness Tester—Designed for use with plastics, aluminum, brass, and other materials, a portable hardness tester for use on fabricated parts as well as on raw stock can be operated by unskilled personnel. Exerting pressure against the instrument drives a spring loaded indenter into the material to be tested. The indenter must be perpendicular to the surface under examination. The instrument can be used in any space that allows room for the operator's hand to grip it. Hardness readings are instantly indicated on a dial located at the head of the tester. *Barber-Colman Co., Rockford, Ill.*

Tensile Tester—Having a guaranteed accuracy of ± 1% of indicated load, this hydraulically operated tensile strength tester is claimed to meet Army, Navy, Federal, and A.S.T.M. specifications. The unit has dual-capacity load ranges of 0 to 1000 and 0 to 5000 lb., weighs 70 lb., and is 36 in. long. Accessories which will adapt the machine to compression and flexure strength testing are available.

Designed for operation on 110-v. 60-cycle current, the testing machine finds application for spot weld certifications, terminal pull-off strength testing, and flexure tests on rigid plastics. *Pacific Scientific Co., 1430 Grand Vista Ave., Los Angeles, Calif.*

Steam Generators—Series BBC packaged boilers for steam generation at point of use are designed for installation alongside plastics presses, rubber rolls, jacketed kettles, or other steam-using equipment. Floor space requirements are said to be about ½ sq. ft./hp. of boiler. A single boiler drum continuously and automatically regulates input of electric power to balance steam load and maintains non-fluctuating steam pressure at a predetermined setting.

The units, available in standard sizes from 1½ to 60 hp. and pressures to 500 p.s.i., operate at over 98½% efficiency and 100% power factor. According to the manufacturer, each boiler is built to the A.S.M.E. code, inspected, and stamped by National Board Inspectors. *Livingstone Engineering Co., 100 Grove St., Worcester, Mass.*

Extruders—A line of extruders consists of four models, all equipped with cylinders divided into two or three independent and adjustable heating zones and one or more cooling zones. Regulation of temperature for each heating zone is accomplished by means of one thermocouple each, connected to an automatic control pyrometer incorporating a special energy regulator. A special

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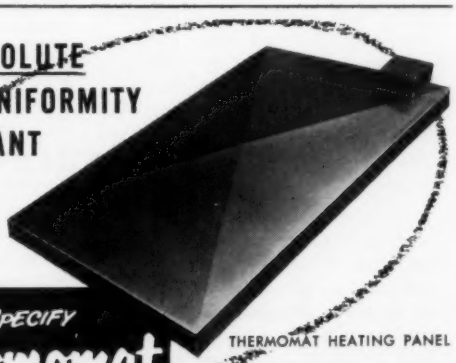

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SPECIFY Thermomat HEATING PANELS provide uniform surface heat and maintain accurate control of temperatures to 1200° F.

They have proved ideal for preheating plastic sheets and drying and curing fabrics and coatings.

We are also fabricators of single or double table, straight or drape VACUUM FORMING MACHINES.

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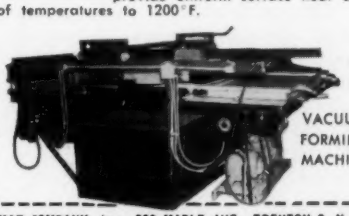

VACUUM FORMING MACHINE

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Gentlemen: Without obligation, please send us your brochure on Thermomat Radiant Panels and Vacuum Forming Machines for industrial applications.
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Manufacturers who want a shiny high polish or a rich matte finish on their vinyl sheeting can eliminate the necessity of an extra polishing run on an embosser by adding a Liberty Polishing Unit to their calender. The Liberty Polishing Unit works its magic equally well on virgin and reprocessed materials.

This hydraulically powered unit is made in widths from 39" to 84", and is synchronized in with the calender. It actually increases production . . . because it may be used to *decrease* the gauge of the material as it comes from the calender and polish it in a single operation. An operator is not needed.

Liberty Machine Co. also makes high chrome cylinders, embossing machines, printing presses, inspection units and other equipment for plastic sheet processing. Write for details on these units. LIBERTY MACHINE CO., INC., 275 Fourth Avenue, Paterson 4, New Jersey.

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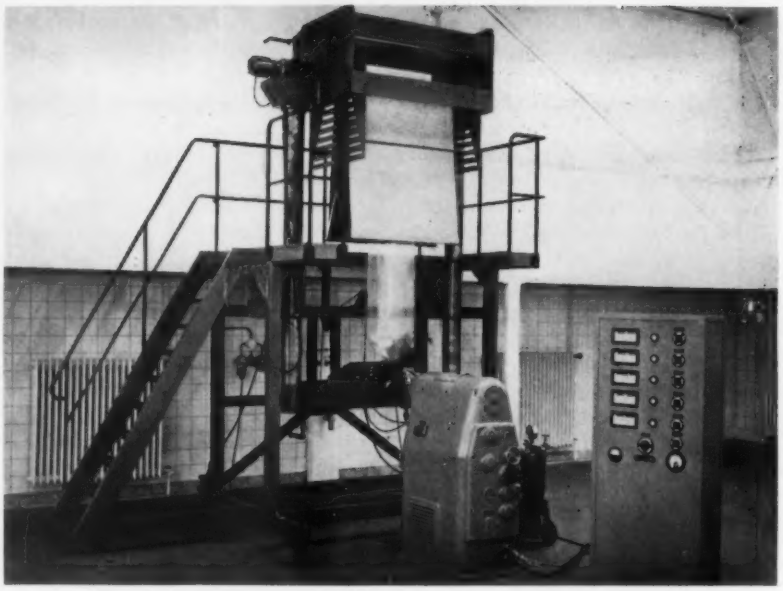
LIBERTY MACHINE CO., INC.



Reifenhauser's extruders are available, among others, with blower heads

design of energy regulating pyrometer is used to allow the heating time to be graduated infinitely variably from 2 to 17 sec., adjustable on the pyrometer scale in sub-divisions during the time cycle of 20 seconds. The heating zone input is thus balanced with heating energy as consumed by same. In this way a guaranteed accuracy of temperature of ±1° C. is maintained. Contact points of thermocouples are within a small fraction of an inch of the interior walls of the cylinder and extrusion head respectively, in order to measure the temperature of the flowing material as accurately as possible.

All four models are available with the following heads: angle extrusion head (for wire and cable coverings, tapes, etc.), straight-line extrusion head (for rigid and flexible tubing, filaments, profiles, etc.), and blowing head (for the production of blown film). In addition, Model S 45/RG-V is available with a cross extrusion head, used mainly for extruding polyamide coverings, tubing, tapes, profiles, etc. Extruders are manufactured by *A. Reifenhäuser, Maschinenbau, Troisdorf/Rhld., Germany,* and distributed in the United States by *H. H. Heinrich Co., 111 Eighth Ave., New York 11, N. Y.*

Specifications for the extruder line are given in the Table below.

Pumps — For variable-speed, straight-line, and rotary-drive applications requiring 1 to 3 hp. with speed and pressure control, a line of one- and two-way variable delivery pumps finds application on winders, unwinders, extruders, conveyors, cutters, and other equipment. Each pump comes as a complete package incorporating a variable-delivery, high-pressure, radial-piston pump with balanced flat valve; a constant-delivery, low-pressure gear pump; a three-way suction and return valve for differential systems; dual disk-type check valves for non-differentiating systems; a

Specifications for Four Reifenhauser Extruders

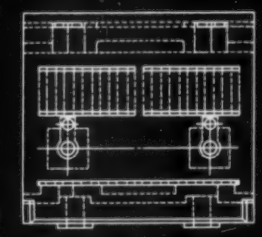
	Model			
	S 30/RG	*S 45/RG-V*	*S 60/RG*	*S 90/RG*
Screw diameter (in.)	1.18	1.77	2.36	3.54
Screw revolution speed, infinitely variable (r.p.m.)	26-120	18-81	20-60	15-68
Extruder output (lb./hr.)	11-22	22-4	44-88	18-176
Main driving motor (hp.)	0.3	5.5	7.5	20

BAKER

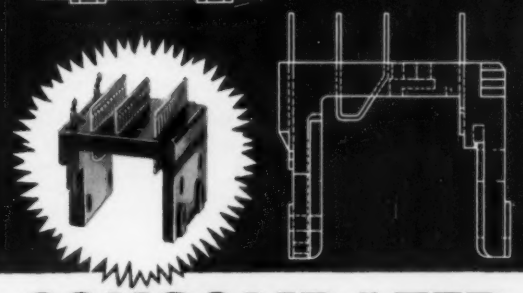
Manufacturers of 30 Ton Automatic Compression Molding Machines with Minimum Lost Cycle Time.

BAKER BROTHERS, INC., Toledo 10, Ohio
PRODUCTION MACHINERY . . . SINCE 1867

CMP "Your Blueprint In Plastics"
ALL MATERIALS • ALL PROCESSES



Custom Molding



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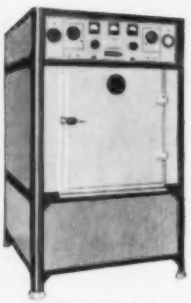

Complete technical information on the DMC model and other Weather-Ometers is contained in the new Weather-Ometer catalog. A copy will be mailed on request.

Accuracy in test results is greatly increased in the new DMC Weather-Ometer by a positive control of specimen temperatures.

A constant volume of air at a controlled temperature in the heavily insulated cabinet, maintains uniform predetermined specimen temperatures regardless of variations in room conditions.

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double-acting, high-pressure relief valve; and a gear pump relief valve.

Models range from 710 to 1750 r.p.m. in drive speed, and from 440 to 1120 cu. in./min. in maximum delivery. Maximum continuous working pressure is 1140 p.s.i.; peak pressure (10% of cycle maximum) is 1350 p.s.i.

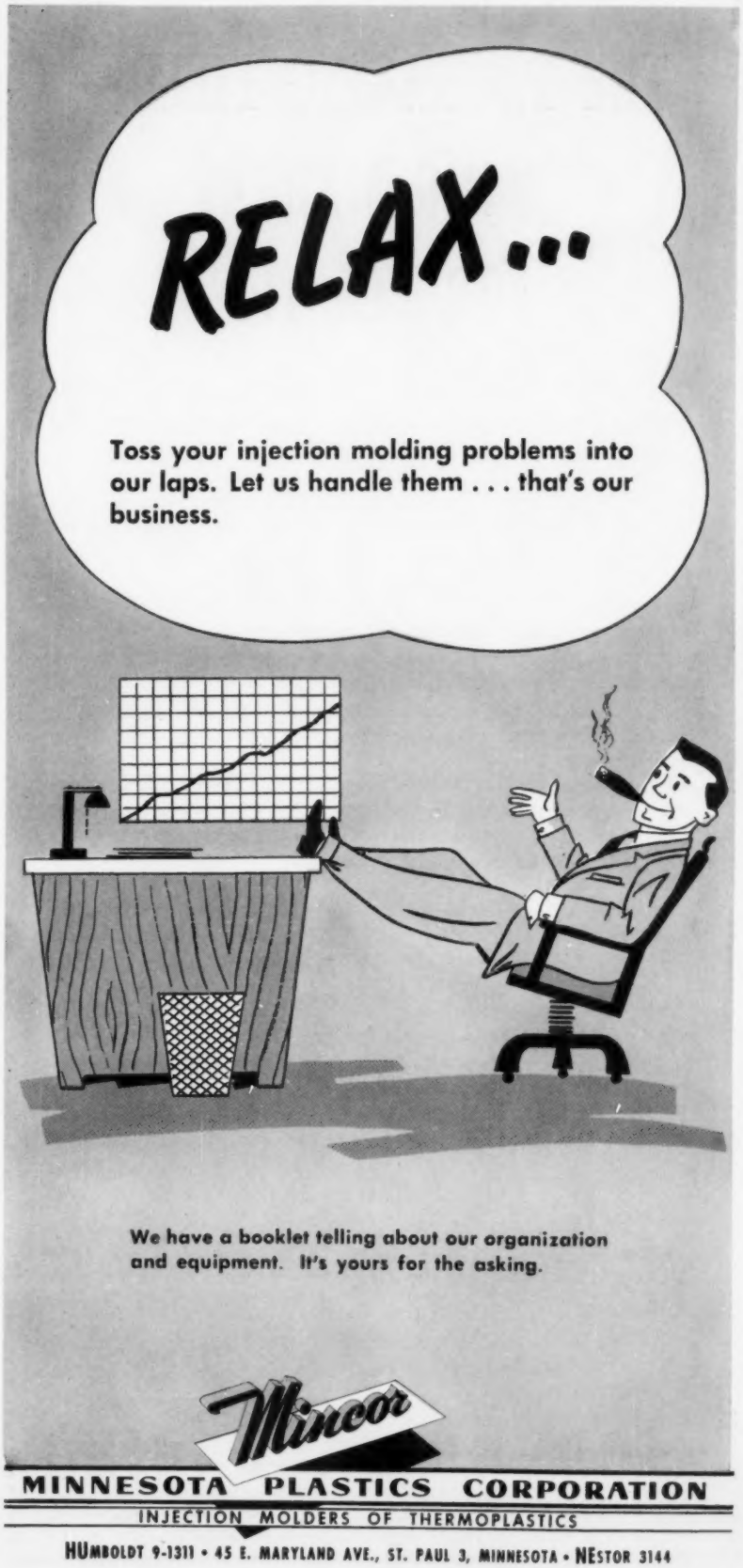
Various controls mount on either side of the pump case; and the pumps can be mounted on reservoirs integral with machines or furnished with standard oil reservoirs for mounting both pump and electric drive motor. *The Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis.*

Painting Machine—Stationary gun pressure-contact spray decorating machine for painting areas up to 3 by 1½ in. is claimed to have a capacity of up to 1500 pieces/hr., depending on shape and size of part. The machine is primarily intended for painting depressed or raised spots on die casts, fine detailed dials, dolls' eyes or mouths, bumper guards, headlights, and radiators on toy cars, and the like.

Placing the part into the mask and depressing the table top about ¼ in. starts the paint operation. Duration of spray is timer-controlled, and air pressure and "atomized" air are maintained constant by a regulator and gage. The unit occupies a floor space of 18 by 26 in. and stands 36 in. high to the center of the mask plate. Mask measures 4 by 8 in., and is held in place by swivel spring tension clips. The unit is available with one or two stationary positions. *Conforming Matrix Corp., 364-2 Toledo Factories Bldg., Toledo 2, Ohio.*

Marking Accessory—Combination mandrel and cradle roll fixture for marking tubular parts consists of a pressure-lubricated mandrel block, moving on ball bearings, which is driven from one end by a gear and rack operated by the movement of the marking machine, and an adjustable cradle roll which is mounted directly underneath the mandrel to carry the major load of tubular parts extending some distance from the hub.

An interchangeable type or die holder can be used in either a cold or heated head. The holder can handle up to three lines of interchangeable lettering, interchangeable type, or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"Big Market," is right! The men who select the materials used to package the output of 45 of America's biggest industries control a market that may hit the 10 billion dollar mark this year.

Typical of the 45 industries that comprise this rich market are companies which manufacture and package foods, cosmetics, chemicals, drugs, candies and tobacco products. In all these highly competitive industries frequent packaging changes are the order of the day. Factors ranging from fascinating sales appeal to plain hard costs influence the men who make the packaging decisions. Consequently, no one type of packaging material (glass, metal, paper or fabric) ever has assurance that it won't be supplanted by another.

And now plastics have entered the arena as directly competitive materials for packaging. In just the last few years they have come to play an increasingly important role—and often at the expense of older, "traditional" materials.

Especially noteworthy is the fact that plastics can be used in the manufacture of almost every basic package type: box, bag, bottle, drum, jar, vial or collapsible tube!

Right now this frontal invasion of the packaging field by alert plastics manufacturers, molders, laminators and fabricators has just begun. And their chief sales tools are the two publications which reach the men who make packaging decisions in all 45 industries—MODERN PACKAGING Magazine, issued monthly, and the annual MODERN PACKAGING ENCYCLOPEDIA ISSUE.

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Additional data on using these media to help expand your sales to the packaging market are contained in the booklet "Facts about MODERN PACKAGING and the Packaging Market." Write for your copy.

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dies, and can apply the marking either lengthwise or crosswise. The unit incorporates a roll leaf feed.

Over-all dimensions of the fixture are approximately 10 by 10 by 5 in. high. *The Acromark Co., 5-15 Morrell St., Elizabeth, N. J.*

Indicator Control—Model 297 Capacitrol finds application in the control of injection molding, extrusion, and vacuum forming operations. The unit consists of two plug-in parts: an electronic control chassis and a temperature measuring system.

A direct deflection resistance galvanometer movement provides measuring and institutes control action. Circuit design of the unit—designated "electronic link"—is such that the approach of the control point is anticipated and thus provides "straight-line" control. This action compensates for various heat transfer lags. Straight-line control results from a millivoltage developed across one or the other of two identical resistors which are inserted in the circuit. This voltage, developed by a sensing thermocouple and added by one or subtracted by the other resistor, depends on the polarity of the thermocouple millivoltage, which in turn is determined by whether the temperature is above or below the control point. The length of time this millivoltage is negative or positive proportions the effect this inserted value will have when the temperature nears the control point.

Thermocouple break protection, which is designed to shut off the fuel supply in case of thermocouple or lead wire failure, is supplied optionally. *Barber-Colman Co., Wheelco Instruments Div., Rockford, Ill.*

Program Controller—Gardsman Model JG series is designed for completely automatic process control of any time-temperature cycle, with off-on, proportioning, high-limit, or stepless control action, plus secondary control action. Once the desired time-temperature cycle for a given operation has been determined, it can be repeated automatically as frequently as desired.

In the instrument's indicating system, a thermocouple-actuated current triggers a millivoltmeter and controls the indicating pointer. In the control system, a setting arm carrying a setting pointer is moved along a scale by a controlling cam,

driven by a synchronous electric motor. Control is obtained through the use of a flag on the indicating pointer which interrupts the light beam between a photo cell and light source that is mounted on the setting arm. The output of the photo cell is amplified by a magnetic amplifier (no vacuum tubes are used, no warm-up required).

Model JG is used where off-on control is suitable; Model JPG finds application where proportioning control is required; Model JLG serves as control where an alarm or other switching action in high-limit safety applications is needed; and Model JSG is employed where extremely accurate stepless control must be maintained.

A secondary control incorporated in this series of instruments is said to enable the user to start or stop the cycle at any predetermined time or to operate auxiliary equipment (stepping relays, timers, additional heating capacity, blowers, etc.) at any point in the cycle. *West Instrument Corp., 525 N. Noble St., Chicago 22, Ill.*

Drill Press Drive—Designed for drill presses having a 2¾-in. column, this variable-speed drive provides an over-all stepless speed variation of 9 to 1. The unit is installed on the drill press by slipping a mounting bracket over the drill column and applying V-belts of the correct length. The bracket supports a spring-actuated sheave which is claimed to assure maximum pull at all times. Speed variations are obtained through a control knob which locks into position after speed has been set. The original standard drill press motor, cone pulley, and spindle pulley are all retained. Belts are standard V-belts. Shipping weight of the drive unit is 9 pounds. *Speed Selectro, Inc., 118-W Noble Ct., Cleveland 13, Ohio.*

Pyrometer Improvement—By incorporating an illuminated dial in a line of hand pyrometers, readings in poorly lighted areas are made possible without the use of flashlights or auxiliary lighting. The dial is lighted by a bulb under the dial shield; the push-button-actuated bulb operates from two "pen lite" batteries located in the instrument handle. *Claud S. Gordon Co., 3000 S. Wallace St., Chicago 16, Ill.*

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BOOKS AND BOOKLETS

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"Principles of Polymer Chemistry," by Paul J. Flory

Published Dec. 1953 by Cornell University Press, 124 Roberts Pl., Ithaca, N. Y., 688 pages, 146 figures, 43 tables. Price: $8.50.

The technological advances in materials and products that have accompanied the forty-fold growth of the plastics industry during the past 20 years have been well publicized in the technical and public press. The scientific researches upon which this modern industry is based have also gained momentum during this period. They have resulted in a large and scattered literature presenting the evidence for establishing quantitative relationships and developing new theories in the field of polymer chemistry. This book, as written by an outstanding chemist, is intended to reduce this massive literature to a single text outlining the fundamental principles of polymer science.

Two introductory chapters review early developments and set forth elementary concepts for the newcomer. The next three chapters deal with polymerization mechanisms. Six chapters are devoted to the postulation and determination of the molecular structures of polymers. The final three chapters cover the thermodynamic and configurational relationships that exist for a polymeric molecule in dilute solution.

This timely contribution to the literature on high polymers can be used both by the experienced investigator and the graduate student as a concise and instructive review of modern polymer science.—*G.M.K.*

"A.S.T.M. Standards on Plastics"

Published in 1954 by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 741 pages. Price: $5.75.

The May 1954 edition of this compilation includes, in their latest form, 142 A.S.T.M. standards, including 92 test methods, 32 specifications, 14 recommended practices, and 4 lists of definitions relating to plastics, methods of mechanical testing, and conditioning and weathering. Sponsored by A.S.T.M. Committee D-20 on Plastics, this publication should prove to be of great value to both producers and consumers of plastics. The standards cover properties (strength, hardness, thermal, optical, electrical, and permanence), analytical methods, molds and molding processes, conditioning, and specifications. New material includes specifications and test methods for cellulose acetate sheet and film for primary insulation; non-rigid thermoplastic compounds for automotive and aeronautical applications; shrinkage of molded and laminated thermosetting plastics at elevated temperature; and measuring water vapor transmission of materials in sheet form.

"L'Encyclopédie Française Des Matières Plastiques"

Published in 1954 by Industrie des Plastiques Modernes, 40 Rue du Colisée, 40 Paris (8e), France. 500 pages Price: 2500 frs. (ca. $6.65), 2220 frs. in France. In French.

This survey of plastics materials and production methods provides the French-speaking reader with a concise handbook to the plastics field. The following subjects are covered: raw materials; resins (thermoplastics, thermosetting, silicones, synthetic rubbers, ion exchange resins); molding methods (compression, transfer, extrusion, calendering, injection, forming); fabricating and finishing operations; applications; properties charts and formulas; and others.

"Monomeric Acrylic Esters," by Edward H. Riddle

Published in 1954 by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 221 pages. Price: $5.00.

Designed to provide a background of information to serve as a starting point and guide to those working with acrylate and methacrylate esters on a laboratory, pilot-plant, or commercial scale, this volume presents up-to-date technical information on the commercially available grades of both chemicals. Some of the topics covered include preparation of monomeric acrylic esters, physical properties, methods of removing inhibitors, explosive limits, toxicity and handling, polymerization methods, uses of acrylic esters as intermediates in chemical reactions other than polymerization, and methods of determining the purity of monomers. The author and his collaborators are active in chemical engineering and chemical research at Rohm & Haas Co.

"Successful Commercial Chemical Development," edited by H. M. Corley

Published in 1954 by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 374 pages. Price: $7.75.

How a chemical product is developed from the laboratory to the commercial marketing stage is investigated in detail in this volume sponsored by the Commercial Chemical Development Association. After reviewing the growth of the chemical industry in general and the role played therein by organized chemical development, the book describes each step involved in the evaluation and development of a new chemical. It discusses the different objectives of the development group during each stage of a product's progress and offers practical advice on problems which have to be overcome. In addition, a number of case histories of successful and unsuccessful products are presented. Other topics include advertising, pricing, packaging, labeling, toxicology, safety, and handling. The final chapter outlines some of the more important qualifications for commercial chemical development work.

"Wachs-Enzyklopadie, Vol. I," by L. Ivanovszky

Published in 1954 by Verlag für chemische Industrie H. Ziolkowsky K.-G., Augsburg 2, Postfach, Germany. 232 pages. Price: DM 11.00 (ca. $2.60). In German.

A revised and enlarged edition of a work originally published 20 years ago, this contribution to the rather limited literature on waxes has as its task to present an up-to-date, condensed survey of the field of waxes. It covers such subjects as production and usage of waxes, types

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of waxes, chain compounds, structure of waxes, rigid systems, semi-solid/solvent systems, etc. Volume II of the encyclopedia, now in preparation, will deal with analysis, commercial properties, and technology of waxes.

"Plastics for Fun," by Alexander F. Bick

Published in 1954 by The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis. 96 pages. Price: $3.25.

The arts-and-crafts enthusiast wishing to expand his activities into the plastics field, will find this book a good introduction. Limiting his subject to acrylic and polyester resins, the author presents a brief survey of the general hand and machine working methods used on plastics, and then goes into a detailed consideration of over 60 work projects, the majority of which are in acrylic. A feature of the book, of special value to the beginner, are full-sized patterns for many of the projects.

"France-Plastiques"

Published in 1954 by the Société de Éditions et Productions Publicitaires, 27, rue Laffitte, Paris IXe, France. 905 pages. Price: 1650 F. (ca. $5.00) In French.

The sixth (1954) edition of this annual directory again gives an over-all classified survey of the French plastics industry. It covers equipment manufacturers, materials makers, molders, and fabricators, as well as importers and distributors involved in the various phases of plastics, all listed alphabetically under appropriate classifications. A list of tradenames and brandmarks, manufacturers' societies, educational institutions, and publications is included.

Fatty chemicals—A line of fatty acids, fatty alcohols, glycerides, and sperm oils is presented in this well-prepared 40-page product catalog. In addition to listing average specifications, typical compositions, and application notes for each of the chemicals presented, the catalog provides a brief chemical introduction to each group of fatty chemicals. These introductions give the general molecular structure and the relevant chemical reactions for each group. Also included is a section on important fatty oil test definitions. A number of charts are appended which cover solubility; temperature

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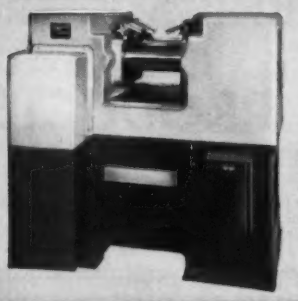
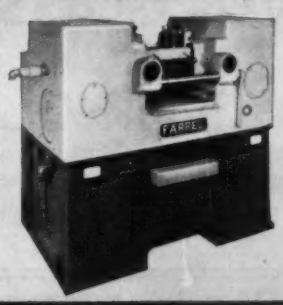
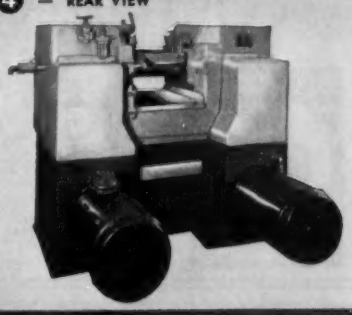
2 — REAR VIEW



3 — FRONT VIEW



4 — REAR VIEW



	Method of Speed Control	No. of Motors	HP Each Motor	Friction Ratio	Roll Speed (RPM) Front	Back
1	Constant	1(AC)	7½	1.4:1	23.5	33
2	Vari-pitch Pulley	1(AC)	7½	1.4:1	13 to 24	18 to 34
3	Vari-pitch Pulleys	2(AC)	5	Variable	20 to 38	18 to 34
4	Variable Voltage	2(DC)	5	Variable	4.5 to 34	6 to 45

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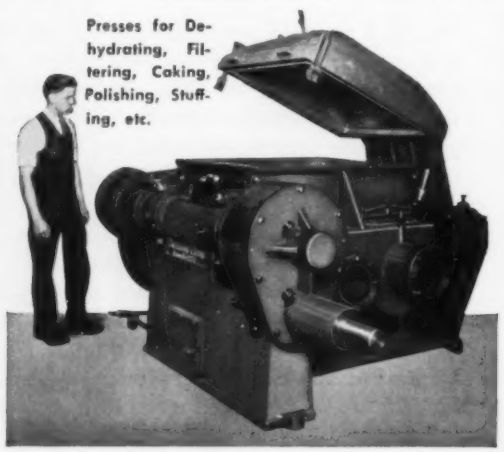

Mixers: Plain or Stainless
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conversion; thinners, solvents, and plasticizers; and driers and soaps. *Archer-Daniels-Midland Co., Chemical Products Div., 2191 W. 110th St., Cleveland 2, Ohio.*

Packaging for plastics—Addressed to the plastics molder and fabricator at the management level, this 34-page booklet, entitled "How to Pack and Ship Plastics to Save," presents an incisive discussion of the problems faced by the manufacturer of plastics products in transporting his merchandise from the originating plant to the various points of destination, and offers numerous suggestions on dealing with these problems. Some of the subjects covered are: selection and testing of containers, especially in reference to utilizing maximum container space; stacking and loading; preparing loads for shipment; classification of rates, and how they are determined; common carrier regulations; container standardization and prepackaging; overpackaging; and others. Reference sources are included. *Monsanto Chemical Co., Plastics Div., Springfield, Mass.*

Synthetic methanol—Booklet F-8141 contains information on the uses, physical properties, shipping data, specifications, and constant boiling mixtures of methanol. Graphs on vapor pressures, specific gravities, freezing points, viscosities, and other important physical properties are also included. Methanol finds application in the production of antifreezes, pharmaceuticals, dyes, fuels, resins, adhesives, rubber accelerators, wood stains, duplicating fluids, refrigerants, fumigants, and plasticizers. *Carbide and Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.*

Malonylurea—Properties, specifications, shipping, and toxicity information on barbituric acid are presented in this eight-page technical data bulletin, together with suggested applications. Barbituric acid has a pyrimidine structure which is necessary in the synthesis of purine derivatives. *Kay-Fries Chemicals, Inc., 180 Madison Ave., New York 16, N. Y.*

Epoxy resins—Recommendations of various types of epoxies (filled, unfilled, white, colored, etc.) for use in plastics tooling are presented in Bulletin EP-54-6. *Furane Plastics, 4516 Brazil St., Los Angeles 39, Calif.*

Temperature control—Bulletin 70 gives specifications, operational details, and suggested applications for a temperature-monitoring system. The system is said to be applicable to a wide range of temperature-monitoring problems by using its various components in different combinations to meet the requirements of a number of different situations. *Thermo Electric Co., Inc., Saddle River Township, Rochelle Park P. O., N. J.*

Boxes—This catalog contains a line of rigid plastic boxes made from stock molds in a variety of shapes and sizes. *Oppenheim Co., 55 W. 42nd St., New York 36, N. Y.*

Production aid—This slide-rule type calculator is designed to simplify production of cast phenolic parts. One slide provides cubic volume of parts of given length, height and weight; another gives pounds of resin for given volumes; a third lists amount of hardeners required for given poundages of phenolic casting resins; and others convert pounds and fractions of pounds into grams and ounces. Physical properties and applications for various grades of resin are listed. *The Marblette Corp., 37-21 30th St., Long Island City, New York.*

Finishing operations—Equipment, materials, and methods for various finishing and polishing operations on plastics products are described in some detail in this 26-page booklet. The techniques covered include deflashing (wire-mesh barrels, closed metal barrels), smoothing marks and scratches, finishing with granules and balls, and polishing (barrel polishing and mop polishing). *Lacrinoid Products Ltd., Gidea Park, Essex, England.*

Nylon in bearings—This eight-page technical brochure and catalog discusses the operating principles and applications of "nylined" bearings. These bearings consist of an outer metal sleeve and a thin lining of nylon bearing material. The liner is retained in the outer sleeve in a manner which permits it to expand and contract circumferentially

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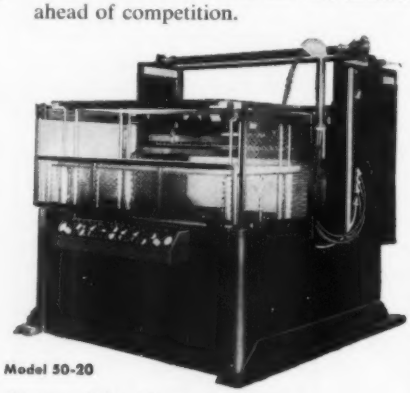

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around the inner periphery of the outer sleeve. The brochure also contains engineering data, installation information, and a bearing evaluation chart. *Thomson Industries, Inc., Manhasset, N. Y.*

Reinforced plastics—Considerations when molding and laminating glass-reinforced plastics with matched metal molds are outlined in this two-page information bulletin. Also discussed are the advantages to be derived from the use of glass mat in such molding, including a reduction in preforming operations and the elimination of "wash." *Bigelow Fiber Glass Products, Div. of Bigelow-Sanford Carpet Co., 140 Madison Ave,. New York 16, N. Y.*

Light-stable polystyrene—Information on properties, fabrication considerations, finishing, and suggested uses for a newly developed light-stable polystyrene formulation is presented in this technical data bulletin. Light stability of this material is claimed to be eight to ten times as good as that of general-purpose polystyrene. *The Dow Chemical Co., Midland, Mich.*

Acrylonitrile syntheses—This 44- by 34-in. wall chart presents in sequential form the methods for converting acrylonitrile into more than 100 derivatives, according to three general classifications: cyanoethylation reactions, nitrile reactions, and olefinic reactions. In addition, the chart contains a literature summary of potential uses for 16 of the more important acrylonitrile derivatives. *Monsanto Chemical Co., 1700 S. 2nd St. St. Louis 4, Mo.*

Vinyl blowers—A line of blowers, in capacities of 500, 1500, and 4300 cu. ft./min., fabricated of Boltaron 6200 non-plasticized polyvinyl chloride, is described in this four-page folder. The blowers are designed to withstand most chemical fumes and air pollution in a temperature range of 40 to 140° F. Mechanical specifications and chemical-resistance tables are included. *Industrial Plastic Fabricators, Inc., Norwood, Mass.*

Temperature control—Bulletin S-6 covers a line of thermostatic temperature regulators, including direct acting, reverse acting, and three-way types. The bulletin lists typical

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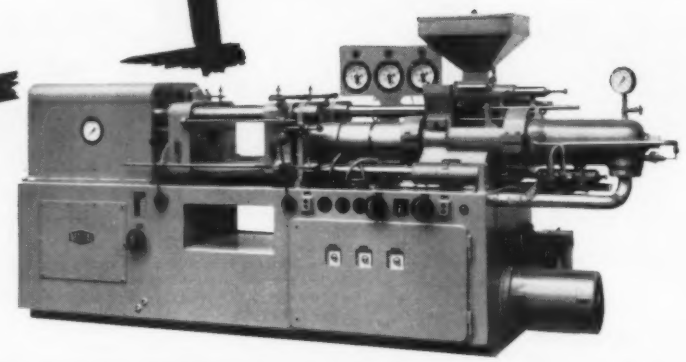

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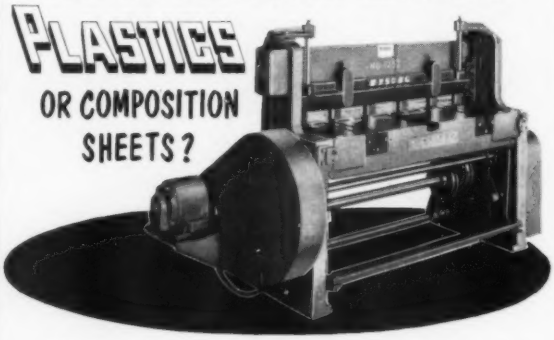

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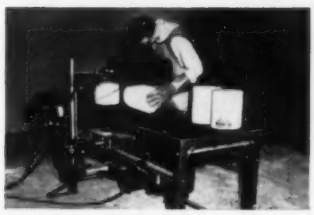

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Vulcanized fibre—Design potentials that can be realized through the application of vulcanized fibre in product development are outlined in this eight-page brochure. Characteristics of the material are given. *National Vulcanized Fibre Co., Wilmington 99, Del.*

Hardness testers—A line of Rockwell hardness testers is described in this catalog. The line includes instruments for normal hardness testing, for superficial hardness testing, and for micro hardness testing. In addition to giving specifications for testers and accessories, the catalog includes sections dealing with the principles underlying the Rockwell test. *Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc., 230 Park Ave., New York 17, N. Y.*

De-potting compound—A compound designed to reclaim electronic components embedded in epoxy or polyester resins is described in this data sheet. Immersing the embedment in the compound, designated De-Solv 292, is claimed to disintegrate the epoxy or polyester, making possible the removal of the electronic components. The compound is said to be suitable for use on parts based on nylon, polyvinyl formal, and linen wrapped wires; all metallic components; ceramic capacitors and resistors; and miniature and subminiature tubes. It is also claimed not to be harmful to phenolic base systems, such as printed circuits. *Ram Chemicals, 200 E. Olive St., Gardena, Calif.*

Plastics tubing—Characteristics of a line of polyethylene and flexible vinyl tubing are presented in these two product bulletins. Properties and suggested applications are included. Tubing is available in sizes from 0.025- to 4-in. diameter, in any length, and in a range of colors. *Gering Products, Inc., Kenilworth, N. J.*

Refrigeration system—Bulletin 220 describes a cooling system package, engineering specifications and explains where and how to use single- and double-seated valves. *Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mt. Vernon, N. Y.*

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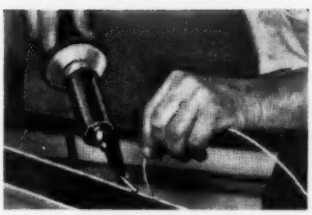

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Waxes—This catalog lists a complete line of waxes (crude, refined, bleached, flaked, and powdered), including carnauba, candelilla, ceresine, montan, japan, ouricury, ozokerite, and others. Grades available, chemical and physical properties, compatibility, and suggested uses are given. *Frank B. Ross Co., Inc., Jersey City 4, N. J.*

Polyethylene-covered wire—Results of an investigation into the burning characteristics of polyethylene-covered line wire are presented in *Kabelitems* (No. 72). Three types of coverings were tested, with the polyethylene covering coming out on top. *Bakelite Co., a Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.*

Propylene oxide—Physical properties, specifications, shipping data, constant boiling mixtures, physiological properties, and uses of propylene oxide are discussed in Technical Bulletin F-8485. This compound is an intermediate for the production of textile lubricants, petroleum demulsifiers, and vat dyes. It also acts as stabilizer for chlorine-containing resins. Its solvent power makes it useful in adhesive formulations. *Carbide and Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.*

Pump maintenance—Trouble location in pumps, compressors, and similar equipment is the subject of a series of illustrated folders. Folder PC-305 gives trouble shooting information on centrifugal, rotary, regenerative turbine, and steam pumps. Folder PC-306 discusses water-cooled and air-cooled air compressors. *Worthington Corp., Harrison, N. J.*

Buying custom moldings—The proper steps to be taken when purchasing custom molded plastics items are presented in this booklet entitled, "So You Are Going to Purchase Custom Molded Plastics." Subjects dealt with include Preliminary Analysis, Detailed Analysis, Choosing the Vendor, Analysis of Quotations, and Final Selection. *The Society of the Plastics Industry (Canada), Inc., 159 Bay St., Toronto 1, Ont.*

Jig borer—This eight-page catalog describes Model 3E Electrolimit jig borer. The machine includes two built-in independent measuring units, one for longitudinal and one for transverse table settings, and is equipped with a double bit boring bar and milling adaptor. Complete specifications are given. *Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford 1, Conn.*

Products and services—Facilities for mold making, examples of molds produced, and equipment used in the manufacture of molds are described and illustrated in this 12-page brochure. *ABA Tool & Die Co., Inc., Manchester, Conn.*

Vinyl chloride—This technical data bulletin discusses vinyl chloride monomer. Included are data on properties, transportation, storage, inhibitors, polymerization, and operating equipment. *The Dow Chemical Co., Midland, Mich.*

Granualtors—Bulletin 260 presents a line of plastics granulating machines. Construction details are described and illustrated, and specifications for each of the various models are given. The bulletin also covers chopping, dicing, and pelletizing machines. *Cumberland Engineering Co., P. O. Box 216, Providence, R. I.*

Protective apparel—Industrial aprons, sleeves, leggings, spats, and gloves, made of vinyl, synthetic rubber, and natural rubber, are cataloged in this four-page brochure, to which are attached swatches of the various materials in different gages and coatings. *The Surety Rubber Co., Carrollton, Ohio.*

Shell molding—A step-by-step demonstration of shell molding operations is presented in a 25-min. sound slidefilm entitled, "Shell Molding and You." The film shows how shell molding fits into the evolution of metal working techniques and affords foundrymen an opportunity to learn the basic procedures in the shell molding process. The film may be borrowed for showings. *General Electric Co., Chemical Materials Dept., Pittsfield, Mass.*

"Nadic" anhydride—Technical Bulletin I-5 presents data on "Nadic" anhydride and its potential use in polyesters, organic coatings, resins, rubber, plasticizers, surfactants, insecticides, and other organic syntheses. Physical properties, chemical reactions, and suggested uses are summarized. A list of 68 literature references is included. *Allied Chemical & Dye Corp., National Aniline Div., 40 Rector St., New York 6, N. Y.*

Destaticized styrene—A polystyrene compound that is said to dissipate static electric charges rapidly and thus not to attract dust is described in this four-page folder. Information on molding techniques as well as on physical properties is included. *Kleestron Ltd., West Halkin House, W. Halkin St., London S. W. 1, England.*

Acetate tape—Typical industrial applications of acetate fiber and film tapes for sealing, protecting, holding, edging, bundling, and splicing are described and illustrated in this six-page folder. Methods for using colored and printed tapes for combination-deal packaging, labeling and identification, and point-of-sale messages in retail outlets are suggested. *Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.*

Marking machines—This catalog lists a line of English-made Rejafix marking machines, including hand-operated models, semi-automatic motorized models, and fully automatic models. Specifications, including printing areas, sizes, and weights are given. Distributed in the United States by *Popper & Sons, Inc., 300 Fourth Ave., New York 10, N. Y.*

Packaging material—Techniques for forming and fabricating rigid cellulose acetate into a variety of packaging products are discussed in this booklet. The techniques discussed include vacuum forming, cutting,

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creasing, folding, sealing, beading, and drawing. Printing and decorating processes are also covered and a list of material suppliers is appended. *Monsanto Chemical Co., Plastics Div., Springfield, Mass.*

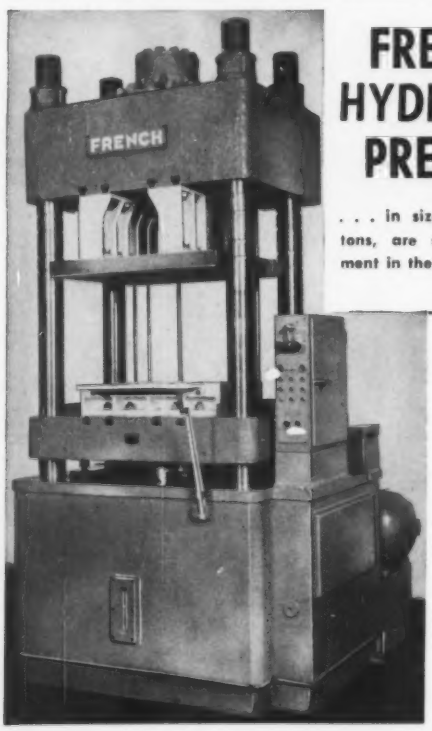
Hydrocarbons—Bulletin 510 (fourth edition) catalogs an extensive line of hydrocarbon compounds, including paraffins, cycloparaffins, olefins, cycloolefins, diolefins, aromatics, and special purpose types in four grades of purity: research, pure, technical, and commercial. Specifications, typical properties, and data on containers and shipping information are provided. *Phillips Petroleum Co., Special Products Div., Bartlesville, Okla.*

Instrumentation—This book, entitled "Instrumentation," lists 775 government-owned inventions in the field of instrumentation with a brief description of each. The listings are classified under eight subgroups as follows: instruments for indicating, measuring, and recording electrical quantities and characteristics; mechanical measuring and controlling instruments; optical instruments and lenses; surgical and medical instruments; photographic equipment and supplies; and others. The inventions listed are ordinarily available to the public on a royalty-free license basis. $2.00. *Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. (Order No. 111464).*

Properties guide—About a year ago, work was commenced on the third edition of *"Dechema-Werkstoff-Tabelle."* This reference work, when complete, will record the behavior of different materials of construction when subjected to the action of more than 1000 active chemical agents. The finished work will contain about 1200 sheets, and is being published alphabetically in groups of 100 sheets about every six months. The third part (a group of 100 sheets, each covering one material of construction), has now been published, so that all sheets ranging from Abietic Acid to Butadiene are now available in alphabetical order (see also MODERN PLASTICS *31*, 257, June 1954). 30 DM (ca. $8.00). A 16-page prospectus, containing one or two specimen sheets and a provisional index of the chemical agents to be dealt with in this series, is available on request. *Dechema, Frankfurt am Main, W. 13, Postfach, Germany.*

Molding equipment—Two bulletins describe several models of plastics molding machines. Bulletin 5404 lists reinforced plastics molding presses in stock sizes of 100, 150, and 200 tons. Bulletin 5406 describes a line of injection molding machines, ranging from 6- to 400-oz. capacities. The line includes fully automatic as well as semi-automatic units. *The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.*

Epoxies—Three epoxy resins are described in this series of bulletins. Technical Bulletin No. 1 deals with BR-18774, a high-viscosity resin (10,500 to 19,000 cp.); Technical Bulletin No. 2 covers BR-18795, a low-viscosity resin (500 to 900 cp.); and Technical Bulletin No. 3 describes BR-18794, a relatively high-viscosity resin (7000 to 19,000 cp.). All three resins are composed of 100% reactive components. Each bulletin gives data on physical properties of each



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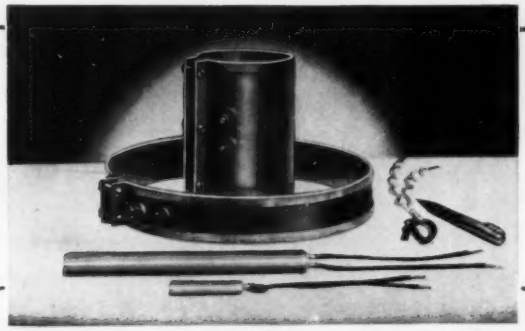

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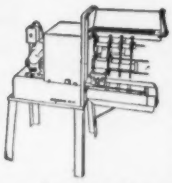

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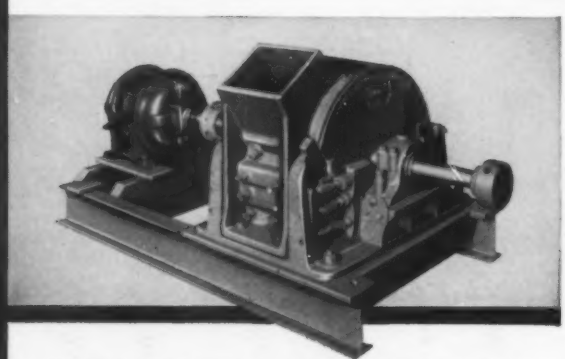
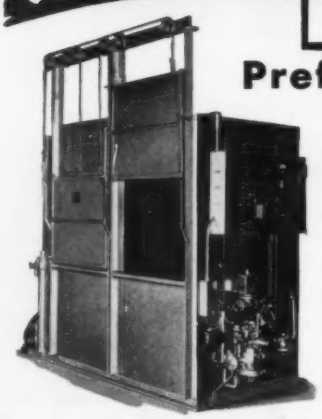


Making hard jobs easy is a regular thing for M & M Plastic Grinders. They quickly cut virgin or scrap material ranging from chunks to film into a usable product for further processing. Send us your plastic reducing problem. We also manufacture plastic pelleting machines.

MITTS & MERRILL
1016 South Water • SAGINAW, MICHIGAN
82

TWIN COMPARTMENT LANLY



Preform Oven *features*
CONTINUOUS, ECONOMICAL, OPERATION . . .

One compartment is loaded while the other processes. Foot control frees operator's hands.

•

Opening one compartment automatically diverts heated air to closed compartment.

•

30 INCH CUBE SIZE

Built-in gas-fired air heater. Pressure burners assure proper burning characteristics with change in oven pressure. Electronic safety pilot for positive flame protection.

Rollers at hearth level facilitate loading and unloading.

Indicating and high level temperature controllers.

ADDITIONAL INFORMATION ON PREFORM OVENS OF VARIED TYPES AND SIZES AVAILABLE UPON REQUEST

The LANLY COMPANY
754 PROSPECT AVE. • CLEVELAND, OHIO

resin and hardener, together with physical, chemical, and electrical properties of recommended resin-hardener combinations. Included in each bulletin is a list of compounders who are equipped to render technical assistance. *Bakelite Co., a Div. of Union Carbide and Carbon Corp., 300 Madison Ave., New York 17, N. Y.*

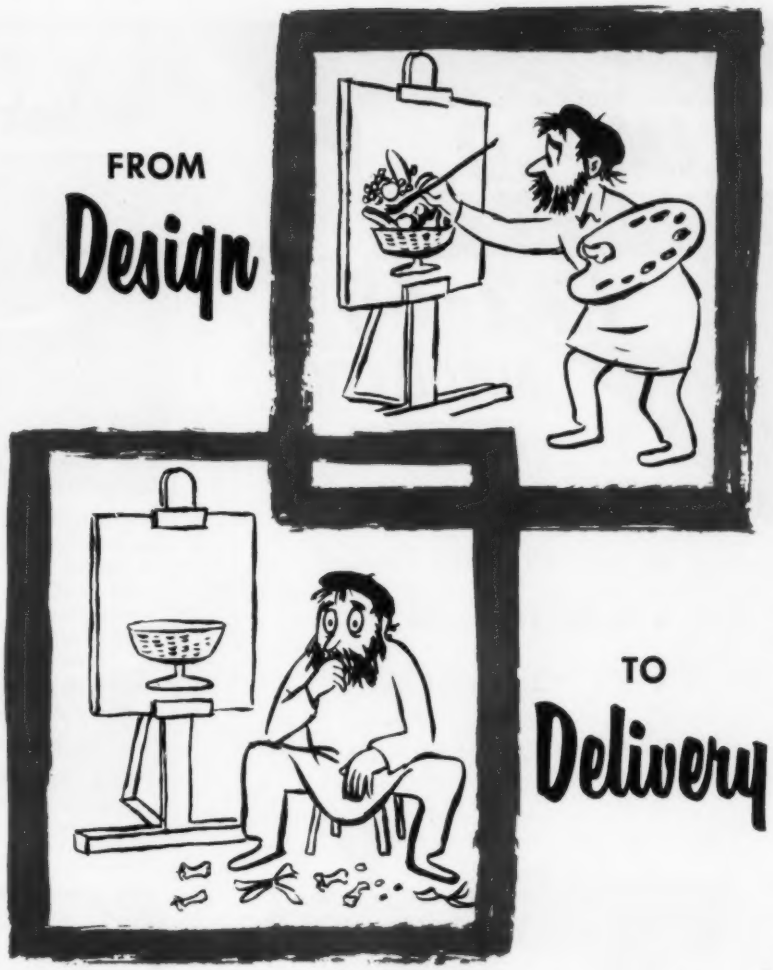
Finishing equipment—Barrel tumbling equipment, claimed to finish plastics articles which were previously considered impractical to finish in tumbling machines, is described in this eight-page brochure. The machine is said not to affect the dimensional tolerances of the pieces, yet to remove burrs, flash, tool marks, etc. *BMT Mfg. Corp., 110 E. 9th St., Elmira Heights, N. Y.*

Laminate—Properties of Phenolite, a high-pressure laminate, are outlined in cartoon form in this 12-page folder. Combining high dielectric strength and mechanical toughness, the laminate is manufactured in sheet, rod, and tube form from which finished products are fabricated. *National Vulcanized Fibre Co., Wilmington 99, Del.*

Polystyrene cleaner—This data sheet contains information on Poly-Kleen, a solvent-type liquid cleaner formulated for removing unwanted lacquer, grease, and mold lubricants from polystyrene and claimed not to mar the surface of the plastic. *Schwartz Chemical Co., 326 W. 70th St., New York, N. Y.*

Duplication unit—This four-page leaflet describes and illustrates a portable device for duplicating shapes and contours on engine lathes. Guided by templets, engineered for each specific operation, the units work on any lathe of 6- to 14-in. swing, regardless of bed length, and are said to duplicate close-tolerance intricate contours, including curve into curve and curve into angle. *The D. C. Caufield Copy-Master, Manchester, Conn.*

Glycols—Technical Bulletin F-7220A presents applications, physical properties, specifications, compatibilities, physiological properties, and shipping information for a line of polypropylene glycols. The colorless, non-volatile, viscous liquids find use



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From the *right* plastics material . . . by the *right* process . . . compression, injection, transfer molding, or vacuum forming . . . Watertown can provide the *right* product to meet your specifications. Our experienced staff of designers, engineers, chemists and production men — working with top-notch equipment and the latest testing devices of a modern laboratory — remains your best possible assurance of a job well done. May we help you? Just write to . . .

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IMPCO

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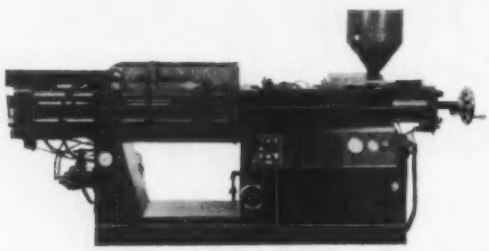
- 2-3 Ounces
- Low Pressure Closing
- Fully Hydraulic
- 15″ Clamp Stroke
- Capacity—60 pounds/hour



This is a high speed injection molding machine for automatic, single cycle or manual operation. Features low pressure closing, adjustable clamp stroke and cushion—both ends. All parts easily accessible for operation and maintenance.
Write for complete information.

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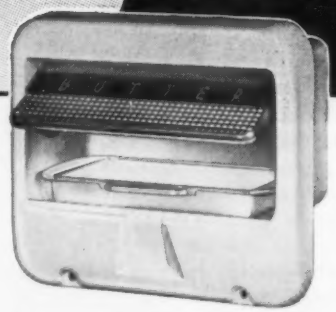

We are today molding countless thousands of precision parts and products for such leading manufacturers as the Admiral Corporation. Their most rigid requirements are being met in our producing for them such items as the Butter Storage Unit (pictured above), Vegetable Crispers, Sterile Lamp Guards, Push-Button Assemblies, Knobs, etc. . . . all for current models Admiral Refrigerators.

In addition to molding all thermoplastics, including Nylon, Sinko has complete facilities for design and engineering, mold-making, metal-plastic fabricating, 2 and 3 color plastic spraying, and hot stamping.

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Sinko MANUFACTURING & TOOL CO.
3137 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

as brake fluids, mold lubricants, chemical intermediates, solvents, humectant modifiers, and others. *Carbide and Carbon Chemicals Co., 300 E. 42nd St., New York 17, N. Y.*

Electrical connectors—Catalog V-2 lists a complete line of Varicon miniature connector systems, said to provide positive contact under all operating conditions and not to be affected by vibration, repeated insertions and withdrawals, and lateral or longitudinal stresses. Specifications and installation information is given for each type. Suggested applications are included. *Elco Corp., "M" St., below Erie Ave., Philadelphia 24, Pa.*

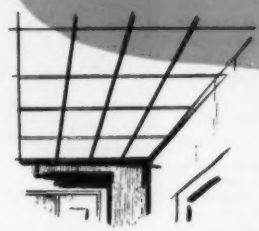
Industry survey—The second in an analytical series entitled "Technology Behind Investment," contains three reviews of the trends and prospects for growth in the chemical, plastics, and fertilizer industries. The first number in the series, published in June 1952, dealt with the petrochemicals, drugs, and synthetic fibers industries. *Arthur D. Little, Inc., 30 Memorial Dr., Cambridge 42, Mass.*

Spindle units—Catalog 40-10 covers an automatic dial-feed multi-spindle machine, said to allow adjustment or conversion of spindles and other mechanisms for the processing of a variety of parts on the same machine. The catalog presents design details, manufactured parts, case histories, operating instructions, and maintenance information. *Bodine Corp., Bridgeport 5, Conn.*

Expandable styrene—Technical and application information on a foamable polystyrene molding compound is presented in this 24-page booklet (see MODERN PLASTICS *31*, 103, May 1954). The material finds use as thermal insulation; in toys, novelties, and displays; for buoyant members; and in packaging. *Koppers Co., Inc., Chemical Div., Koppers Bldg., Pittsburgh 19, Pa.*

Polyester film—Two technical reports on Mylar polyester film cover properties and adhesives, respectively. TR-1 provides information on physical, electrical, and chemical properties of Mylar as compared with cellophane, polyethylene, and acetate film. TR-2 lists in detail the ad-

USE PLEXIGLAS* ACRYLIC PLASTIC



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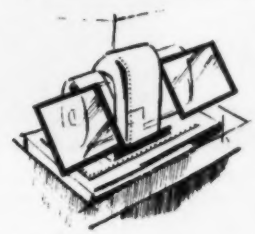
Highly efficient diffusion and transmission of light, color stability, and formability give PLEXIGLAS great usefulness as the diffusing element in wall-to-wall luminous ceilings and individual fixtures.

FOR SIGNS

Excellent appearance and legibility. Complete luminosity from interior lighting at night. Makes possible almost unlimited scope in sign design, from single custom installations to hundreds of dealer identification signs.



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Clear and breakage-resistant, PLEXIGLAS is widely used for machine safety shields, face guards, and industrial goggles. Combines clarity and safety with light weight.

PLEXIGLAS has many plus features that make it the 'IDEAL' material for your purposes. . . .

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- WEATHER RESISTANCE
- CLARITY
- BEAUTY
- WORKABILITY
- LIGHT WEIGHT
- PERMANENCE

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Polyethylene
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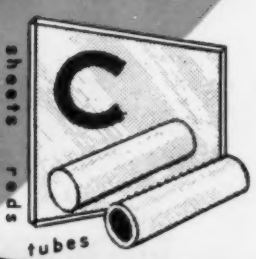
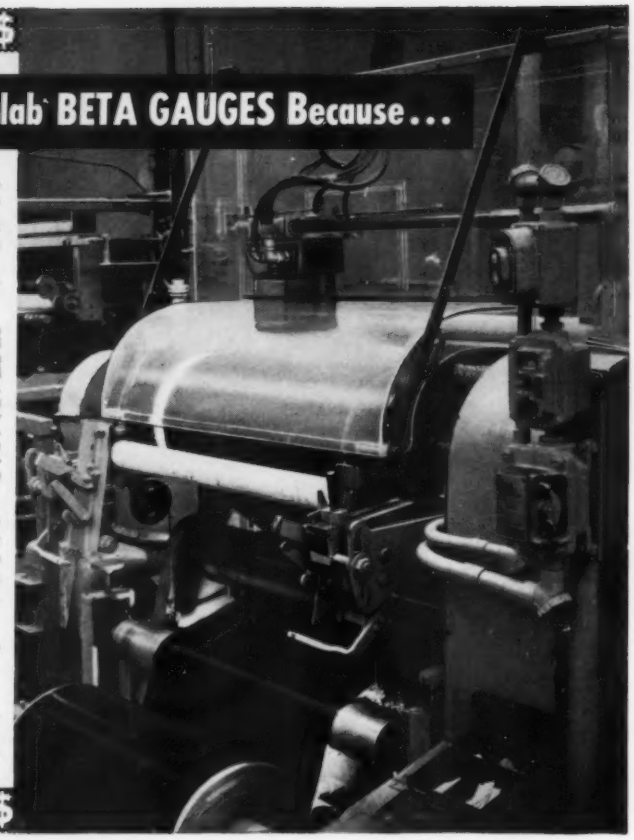


Send for Catalog M-1 "Plastics For Industry"

COMMERCIAL PLASTICS AND SUPPLY CORPORATION
630 Broadway, N.Y. 12, N.Y. · GRamercy 7-5000

PERMACEL TAPE Likes Tracerlab BETA GAUGES Because...



. . . they have found that their Backscatter gauge has improved product quality and increased raw material yields. If you have a sheet control problem, Tracerlab Beta Gauges — Backscatter or Absorption — can do the same for you.

Here are the comments of Permacel Tape operating personnel:

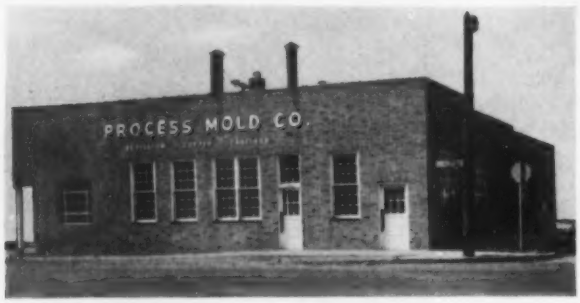
"Permacel Tape Corporation installed the first Beta Gauge in December, 1952. All development runs have been completed and the Beta Gauge has been in use in regular production for four months. Finished product quality has improved and raw material yields have increased from between 2% to 5%. The control of thickness by the Beta Gauge has been amazing to our operators. When installed, our operators were completely distrustful of this 'new gadget' — the Beta Gauge. Our experience has been such that our operators now have implicit faith in the Beta Gauge and are pressing for additional installations. A second Beta Gauge is currently being installed."

Other firms in your industry are buying Tracerlab gauges and are **now** enjoying the cost-cutting benefits they make possible. We'll be glad to demonstrate a gauge right on your production line and let you judge its worth for yourself. NO OBLIGATION.

BOOKLET PT-1 describes the basic principles of beta gauging. A copy will be sent on request.

Tracerlab®
130 HIGH ST., BOSTON, MASS.

Absorption and Backscatter Gauges $3,300



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Throughout New England, plastics users know that Plastic Molding Corp. can, *without prejudice*, consider their molding assignments in terms of *what is best*, not in terms of *what equipment we have* . . . because we have every type of press equipment for molding plastics . . . the *one* molder in this area who offers you *all five major molding methods.*

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SANDY HOOK, CONNECTICUT

Molders of Plastics for over a Quarter Century

hesives recommended for bonding Mylar film to other films, foils, papers, and metals. It also includes a directory of adhesives suppliers. *E. I. du Pont de Nemours & Co., Inc., Film Dept., Wilmington 98, Del.*

Plastics for cars—Design applications of four plastics materials (nylon, acrylic, polyethylene, and tetrafluoroethylene) in the automotive field are outlined in this 10-page booklet. Use of these plastics materials is suggested for electrical, optical, mechanical, structural, and decorative purposes. A properties chart dealing with the four plastics materials is included. *E. I. du Pont de Nemours & Co., Inc., Polychemicals Dept., Wilmington 98, Del.*

Credits: MILLIONS FOR MOLDS

(*See pages* 89-96)

MOLDS

Highway Pioneers and Sailing Ships:
Arrow Tool & Engineering Co.
Inglewood, Calif.

Aircraft Carrier and other Naval Ships:
Roy Anderson
Lynwood, Calif.

Airplane Line:
Paragon Tool Die & Engineering Co.
Los Angeles, Calif.

Pacific Molds, Inc.
El Monte, Calif.

Adams & Sons
El Segundo, Calif.

Johnson Plastic Tool Co.
Southgate, Calif.

Miniature Masterpieces:
Adams & Sons
El Segundo, Calif.

EQUIPMENT

Molds are run on 8-oz. Reed-Prentice Co. and 12-oz. Improved Machinery, Inc. machines.

MATERIALS

Styrene:
Fostarene—H. Muehlstein & Co.
Styron—The Dow Chemical Co.
Lustrex—Monsanto Chemical Co.

Acetate:
Lumarith—Celanese Corp. of America
Tenite I—Eastman Chemical Products, Inc.

Dry Colors:
Ferro Corp.
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better...
faster...
on your plastic products — with superior liquid cleaners made by Schwartz Chemical Co.

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the finest liquid cleaner to remove masking tape and foreign matter from all acrylics

POLYKLEEN
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POLY KLEEN is the ideal non crazing liquid cleaner for polystyrene. Quickly removes unwanted lacquer, swirlmarks, oil, mold lubricants and release agents. Air dries static free without residue.

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Producing PLASTIC PARTS for Industry since 1876

Put Auburn's engineering "know-how" and production facilities to work producing plastic parts for your product! Backed by 78 years experience!

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- Tool and die shop • Engineering services.

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Main Office and Factories Auburn, New York

Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant for transfer to other plants

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled

Materials	*Total p'd'n. first 7 mos. 1954*	*Total sales first 7 mos. 1954*
CELLULOSE PLASTICS:[a]		
Cellulose acetate and mixed ester		
Sheets, under 0.003 gage	9,963,464	9,971,046
Sheets, 0.003 gage and over	6,512,075	6,774,638
All other sheets, rods, tubes	3,133,198	2,863,895
Molding, extrusion materials	40,249,372	39,703,579
Nitrocellulose sheets, rods, tubes	3,560,450	2,964,435
Other cellulose plastics	3,051,879	2,728,764
PHENOLIC AND OTHER TAR-ACID RESINS:		
Molding materials[a]	104,833,477	93,453,553
Bonding and adhesive resins for:		
Laminating (except plywood)	36,017,491	24,374,301
Coated and bonded abrasives	5,321,499	5,770,961
Friction materials (brake linings, clutch facings, etc.)	8,360,656	8,064,163
Thermal insulation (fiber glass, rock wool)	18,899,672	19,626,348
Plywood	15,679,866	15,267,958
All other bonding and adhesive uses	7,759,584	7,903,806
Protective-coating resins	13,573,528	12,711,697
Resins for all other uses	14,805,025	12,641,408
UREA AND MELAMINE RESINS:		
Textile-treating and textile-coating resins	20,226,920	17,397,480
Paper-treating and paper-coating resins	11,163,709	9,966,093
Bonding and adhesive resins for:		
Plywood	42,143,905	39,099,284
All other bonding and adhesive uses, including laminating	13,323,789	12,010,206
Protective-coating resins	15,626,658	11,644,046
Resins for all other uses, including molding	37,980,828	35,418,604
STYRENE RESINS:		
Molding materials[a]	179,218,986	173,539,377
Protective-coating resins	50,049,461	47,806,683
Resins for all other uses	55,613,292	52,632,959
VINYL RESINS, total[b]	292,622,247	281,584,001
Polyvinyl chloride and copolymer resins (50 percent or more polyvinyl chloride) for:		
Film (resin content)		38,834,404
Sheeting (resin content)		34,683,363
Molding and extrusion (resin content)		76,612,575
Textile and paper treating and coating (resin content)[c]		28,527,887
Flooring (resin content)		15,573,374
Protective coatings (resin content)		12,841,202
All other uses (resin content)		16,825,478
All other vinyl resins for:		
Adhesives (resin content)		15,919,429
All other uses (resin content)		41,513,627
COUMARONE-INDENE AND PETROLEUM POLYMER RESINS	98,569,391	108,481,299
MISCELLANEOUS:		
Molding materials[a, d]	106,052,293	89,923,279
Protective-coating resins[e]	4,702,497	2,250,115
Resins for all other uses[f]	66,890,757	70,244,449

* Dry basis is designated unless otherwise specified.
** Partially estimated. † Revised.
[a] Includes fillers, plasticizers, and extenders. [b] Production statistics by uses are not representative, as end use may not be known at the time of manufacture. Therefore, only statistics on total production are given. [c] Includes

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

IN POUNDS* FOR JUNE AND JULY 1954
by U. S. Tariff Commission

*June***		*July***	
Production	*Sales*	*Production*	*Sales*
1,776,944	1,765,599	918,715	1,222,603
1,009,026	1,125,567	695,980	843,608
537,096	461,873	278,906	332,905
†6,416,342	†5,832,692	5,192,869	5,348,884
430,734	386,119	270,637	282,263
429,875	408,754	370,725	484,393
14,573,518	12,910,297	8,583,130	9,226,494
5,292,952	3,642,058	4,142,590	3,113,465
758,100	871,529	532,801	689,308
1,105,211	1,070,009	979,452	942,481
3,016,071	2,900,037	3,370,044	3,611,053
1,645,706	1,781,542	922,392	1,055,269
842,543	769,687	932,176	997,813
†2,161,233	†1,894,632	1,633,944	1,545,719
2,357,930	1,856,436	2,102,478	1,708,104
3,293,125	3,095,630	1,983,014	1,997,662
1,164,395	1,374,285	1,324,096	1,401,405
6,030,908	6,062,535	5,208,955	5,548,279
1,631,672	1,338,440	1,397,707	1,646,684
2,526,469	1,998,432	2,166,442	1,701,198
6,054,032	5,377,062	3,477,363	4,039,810
24,310,839	21,911,313	21.522,041	19,635,780
7,446,427	6,663,681	8,146,533	7,320,301
8,939,090	8,534,224	6,563,740	6,384,561
43,814,285	38,241,074	36,483,650	36,079,645
	5,100,388		5,114,108
	3,002,980		3,440,888
	10,529,008		9,647,627
	3,551,777		3,104,778
	3,553,973		3,356,248
	1,916,310		1,858,661
	2,743,945		2,597,983
	2,499,962		1,949,372
	5,342,731		5,009,980
14,862,328	14,632,026	13,331,241	14,017,283
13,504,705	12,604,754	13,103,788	11,509,896
827,601	374,874	335,016	255,847
10,217,427	10,168,780	9,119,349	10,528,070

data for spreader and calendering-type resins. ‡ Includes data for acrylic, polyethylene, nylon, and other molding materials. • Includes data for epichlorohydrin, acrylic, polyester, silicone, and other protective-coating resins. † Includes data for acrylic, rosin modifications, nylon, silicone, and other plastics and resins for miscellaneous uses.

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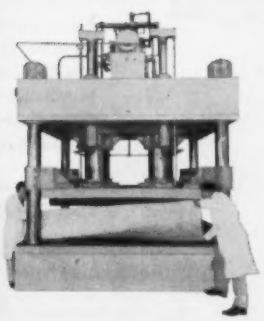
Announces the installation of America's largest press for matched-metal mold operation. This double-ram action press develops 750 ton pressures and is presently being scheduled to turn out precision production of parts up to 5' in width and 14' in length. Write for availability for your product.



IT PAYS TO REMEMBER . . . for reinforced plastic by matched-metal mold — it can be done faster and better by Chemold.

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Manufacturers of Glass-Fiber Reinforced Plastic Products
2000 COLORADO AVENUE, DEPT. MP-11, SANTA MONICA, CALIF.

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The *name*, perhaps, is new, but AUTOMATION . . . with "feedback" control and automatic adjustment . . . has long been a practical working *fact* at Pratt & Whitney. Nearly 20 years ago, for example, P&W Syncro-Timer Control Units, operating in conjunction with P&W Continuous Gages, were successfully applied to the completely automatic classifying and sorting of tin plate on shearing lines. P&W Gages and Control Units that automatically correct the thickness of coating insulation on extruded wire went into operation 8 years ago.

TODAY we are successfully applying the same basic principles to the automatic control of rubber and plastic calenders to insure uniformity of product.

No . . . you don't have to wait for *automation* to happen. Its opportunities for added efficiency, improved product quality and lower costs are available *RIGHT NOW* via Pratt & Whitney. Installations are compact, simple and inexpensive. Take advantage of our wide experience. Call in the Pratt & Whitney Specialist now. There is no obligation.

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MACHINE TOOLS • CUTTING TOOLS • GAGES

Phenolic nozzle of touch-up brush is designed to prevent leakage of paint

Touch-Up Brush

BY MOLDING the two phenolic components of a new touch-up brush to close tolerances, any possibility of leakage of the touch-up liquid from the tubular body of the tool is prevented.

The two phenolic parts are the nozzle which fits into the metal fountain pen-like body of the tool and the exterior cap which screws on over the nozzle. To use the tool, the brush, with the exterior cap removed, is simply turned upside down. In this position, the paint supply stored in the metal tubular body flows down into the nozzle and out through the brush bristles onto the scratched or marred wood surface that is being touched up.

When the exterior cap is removed, a special spring arrangement mounted in a molded nylon sleeve in the nozzle serves to keep the brush bristles in the normal "in use" position. When the cap is replaced, however, a tiny needle-like insert molded into the interior of the cap pushes the bristles back into the nozzle. Since the brush holder must thus have free movement in and out of the nozzle opening, yet has to fit tightly against the opening to prevent leakage while the tool is in use, precision molding is of extreme importance. The close tolerances demanded by the manufacturer are also a protection to the consumer in that air which might dry out the paint is kept from contact with the supply. The phenolic parts are completely unaffected by the paint.

CREDITS: Scratch-Master brush is marketed by Dupli-Color Products Co., Inc., Chicago, Ill. Molding of phenolic parts by Formold Plastics, Inc., Blue Island, Ill., using material supplied by Durez Plastics & Chemicals, Inc.

Toy Car Body

THE same operational advantages and styling that have made the reinforced plastic car body such an outstanding success in the automobile field are now claimed for a new sleek-looking model car being fabricated of polyester resin-fibrous glass laminate for the wheeled goods toy market.

Scaled down to child size, the rugged reinforced plastics body is molded with the long, low lines and graceful styling that has come to be associated with the full-size models. The youngster's sports car is nearly 6½ ft. long from bumper to bumper, its approximate height is only 18 in., and its over-all width is 32 in., providing sufficient room to seat two children side-by-side in the open, low driver's seat.

The complete model weighs only about 65 lb. and is light enough to be moved from place to place by merely picking it up. Like its full-size counterpart, the miniature sports car body resists rust, moisture, tars, oils, and greases.

Each model is equipped with a bicycle type drive that is adjustable to fit the child and a half-circle steering wheel that allows ample room for the youngster in which to work the pedals. The reinforced plastics body is mounted on a welded tubular steel chassis and rolls easily on 12 in. disk wheels with ball bearings.

The car is available in red, yellow, or blue colors and is decoratively trimmed with gold.

CREDITS: Sportsmobile is molded by Bassons Industries Corp., New York, N. Y., using polyester resins supplied by Bakelite Co. and fibrous glass supplied by Owens-Corning Fiberglas Corp.

Reinforced plastic toy auto is styled to resemble full-size sports car

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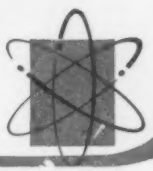

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Shuffleboard discs must glide smoothly, withstand abrasion and take numerous impacts without chipping. They must also meet precision dimensions and weight tolerances and have the right degree of resilience for proper rebounding during play.

If you had to meet these specifications, you'd look for a material that was tough, molded to a smooth finish and—since the demand was great—insist that it fit the requirements of high speed, mass production methods. Chances are you'd do exactly what Dimco-Gray Company, Dayton, Ohio, did. This leading manufacturer of shuffleboard equipment, after researching various materials, selected Rogers RX-425, a medium-impact phenolic.

And here are the reasons why: RX-425 is tough, yet resilient. It molds to an excellent finish. It withstands repeated shocks. Just as important as the handsomeness of the end product is RX-425's production assets. It can be automatically preformed into hard, volume and weight-controlled pills and either transfer or plunger molded. In fact, it is almost as easy to mold as general purpose phenolics. It's available in colors, too.

When you next need a part that has to be tough and yet easy to produce, specify Rogers RX impact phenolics. You'll get the quality you need at an amazingly low unit cost.

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Wire splice (upper right) is protected by vinyl insulator and security rings (center) that are slipped over a brass cap crimped onto the wires with a special tool (left)

Vinyl Insulators Facilitate Splicing

VINYL plays a major role in the design of a unique insulator for splicing applications that has a high dielectric strength and is easy to install.

When using the vinyl insulator, a splice is first made by twisting two or more wires together and inserting them into a copper cap. The entire assembly—wires and cap—is inserted into a special tool, also supplied by the manufacturers of the insulator, and crimped together.

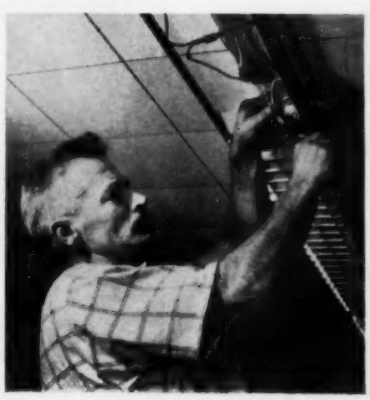
The molded insulator is then easily snapped on over this cap. To insure a satisfactory installation, molded-in raised projections inside the neck of the insulator are designed to engage the crimps in the splice cap. For extra security, a molded vinyl locking ring is slipped on over the outside of the neck. Since the ring can't slip down to the shoulder of the insulator until the projections and indents have mated, a quick visual inspection of the installation can be made by simply looking at the ring.

The vinyl locking rings are molded in a 102-cavity mold with internal threads for quick tightening and external knurls for an easy-to-turn finger grip. The insulators themselves are molded in a 96-cavity mold and are varied in wall thickness to give flexibility where required. The long insulator skirt, for example, is flexible enough to shape itself to irregular wire groupings, while the vital end areas of the unit are beefed up to 0.060-in. thickness. A rugged reinforcing lip running around the periphery of the skirt prevents accidental tearing or cutting of the insulator.

The vinyl insulator, fully approved by Underwriters' Laboratories, is impervious to most solvents, has an insulation resistance of over 2000 megohms M ft. at 15.5° C., and has a reasonably high temperature flow characteristic.

CREDITS: Insulators are a product of Buchanan Electrical Products Corp., Hillside, N. J.; vinyl is supplied by Bakelite Co.

Insulator contributes to speed with which effective splices can be made



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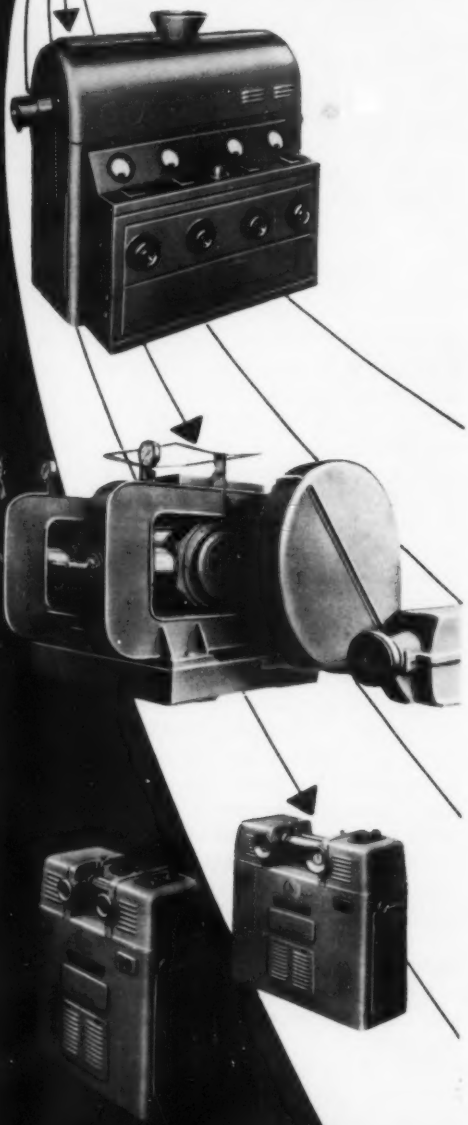

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WEST-GERMANY

Special machine automatically wraps polyethylene tape around gas pipe

Polyethylene Tape

THE first complete natural gas transmission and distribution system to be wrapped with a protective polyethylene film-backed tape is now being installed in Waynesboro, Ga. It is expected that approximately 80 miles of the polyethylene tape will be required to cover the more than 200,000 sq. ft. of pipe surface in the network.

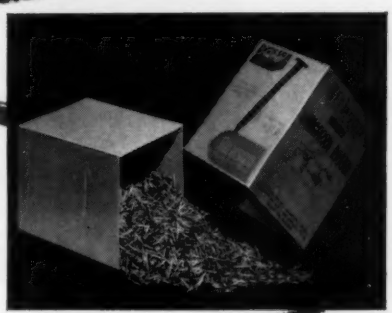
The installation also marks the first time that the polyethylene protective tape will be automatically applied by machine—a highly efficient process that is expected to increase the economical utility of the tapes as corrosion barriers in metal pipeline work. The machine is designed to clean the pipe, wrap it with tape, press the tape firmly to the surface of the pipe, and over-wrap the tape with tar-saturated asbestos felt at top speeds approaching 30,000 ft. a day.

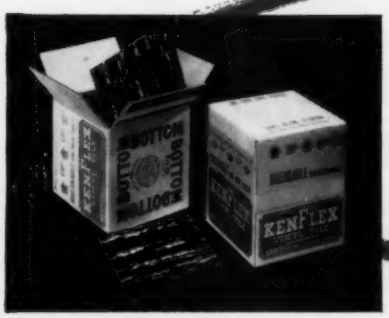
As protection against corrosion of metal pipes, the polyethylene tape has already proved its value in numerous laboratory and field tests. Polyethylene tape is resistant to galvanic, water, and chemical corrosion and will not support fungus growth. To apply the tape to the pipe, no heat, liquids, solvents, or thinners are required. In contrast to the required hot-melt application of common asphaltic and bituminous products, the polyethylene adhesive tape is cold-applied, resulting in production economies.

CREDITS: Polyken polyethylene tape is a product of Polyken Products, Dept. of The Kendall Co., Chicago, Ill.; polyethylene is supplied by Bakelite Co.

ATTRACT
attention

SUBTRACT
shipping costs





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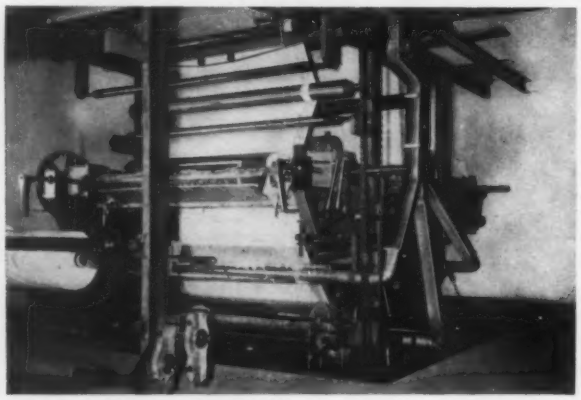

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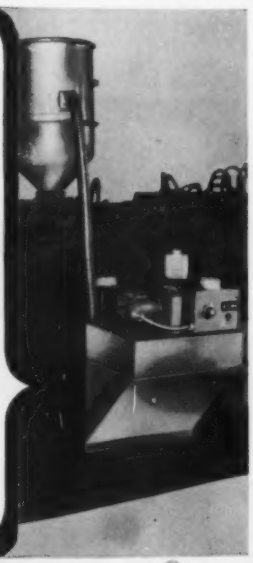
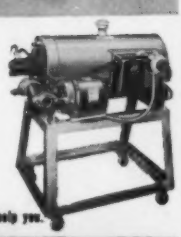
Efficient pre-heating and de-humidifying of material is just one of many jobs done by this timesaving accessory. It speeds production by eliminating handling—because material goes directly to the machine from receiving. No need to load and unload drying ovens. You save floor space, too, because the Hopper-Dryer can be installed easily on standard makes of injection or extrusion machines. Initial cost is less than a drying oven's. Operating cost is low, results are sure.



New Hopper Loader — For continuous automatic feed of any injection or extrusion machine. Clock timer control for starting and stopping. Dust-free operation. **"Die-Temp" Control** — Positive-acting, self-contained mold temperature control at any level between 100-400 degrees F. Fast, compactly built to save space.



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Valve Body

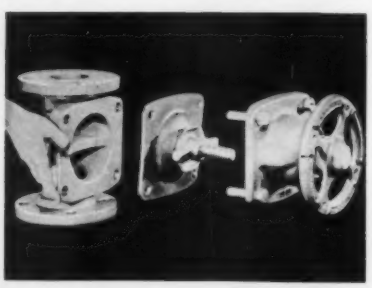
CORROSION-resistant styrene copolymer piping systems that can safely handle food products, chemical solutions, and acids that might ordinarily destroy conventional pipe, are now available with a greater capacity than ever before—thanks to the development of a new copolymer valve body with 3-in. diameter.

Heretofore, the largest styrene copolymer valve in the manufacturer's line had a diameter of only 2 inches. Since the capacity of the piping system is limited by the size of the smallest of its components, this 1-in. increase in valve diameters is regarded as significant, representing as it does an increase in capacity more than double that of a 2-in. system.

Because of the high degree of chemical resistance and low moisture absorption of styrene copolymer, the new valve body, which will be used in such industries as chemicals, water treatment, food processing, etc., will not contaminate the materials being handled, nor will it absorb ingredients of one batch for transmission to the next. In addition, the valve body is odorless, tasteless, and non-porous.

Also announced by the manufacturers of the valve body is a complete line of 3- and 4-in. copolymer pipe fittings. Both the one-piece valve bodies and fittings have no welds or joints at points of stress, and both are made to withstand the same working pressures—up to 150 p.s.i.—and the same temperatures—up to 170° F.—as the corresponding size extra-heavy styrene copolymer pipe.

CREDITS: Bodies and fittings developed by United States Rubber Co., suppliers of the Uscolite styrene copolymer used for the units, in cooperation with Hills-McCanna Co., Chicago, Ill.



Valve parts include styrene body (left), rubber diaphragm, and valve bonnet

B&T

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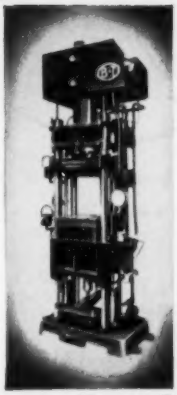
molding equipment

Illustration shows our No. 924, 75 ton High Speed semi-automatic compression molding press fitted with motor driven pump unit and electrically heated platens.

This press has a number of outstanding features including single lever control valve giving high speed ram movements with automatic sowing down at each end of the stroke.

We shall be pleased to supply further information on this and any other machines from our extensive range of Molding Equipment.



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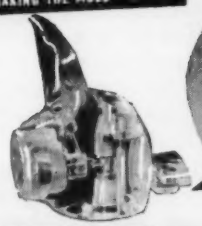

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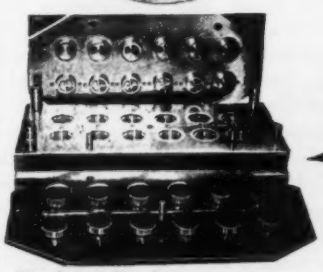

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Six major components molded of nylon are designed into color camera

Nylon In Cameras

BASIC parts molded of nylon add much to the effectiveness of a three-dimensional color camera as a sturdy precision mechanism while, at the same time, keeping manufacturing costs at a minimum.

The camera, designed for 16-mm. unperforated color film, incorporates six nylon parts—a flash contact housing molded in a single-cavity mold in a 3-oz. machine; two lens shields molded in a 4-cavity mold in an 8-oz. machine; a view finder housing molded in a 2-cavity mold in a 3-oz. machine; and a view finder and a shutter slide button, both of which are molded in single-cavity molds in high-speed, fully automatic machines.

These various individual applications make use of different specialized advantages of nylon. In the flash contact housing, for example, the dimensional stability of nylon was the deciding factor in choosing the material. In the lens shield, view finder housing, and view finder, the toughness of nylon was of paramount importance, while in the design of the shutter slide button, it was the abrasion resistance and low coefficient of friction of the material that aroused the manufacturer's interest.

In addition, the strength of nylon in thin sections and its ready moldability into complex shapes made an over-all reduction in the weight of the compact unit possible.

CREDITS: Parts are molded for "Linex" camera made by Lionel Corp., Irvington, N. J. Zytel nylon supplied by E. I. du Pont de Nemours & Co., Inc.

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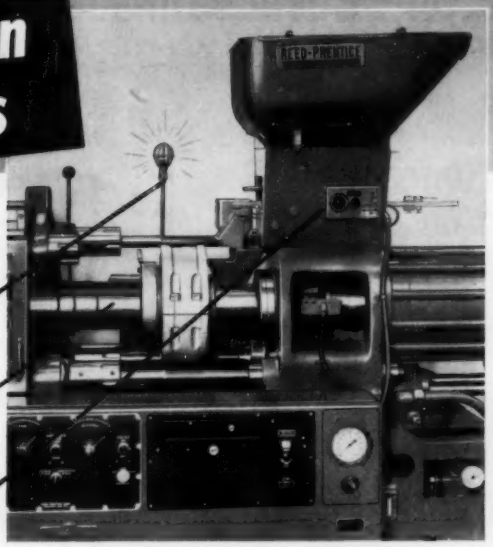
on YOUR "REEDS"



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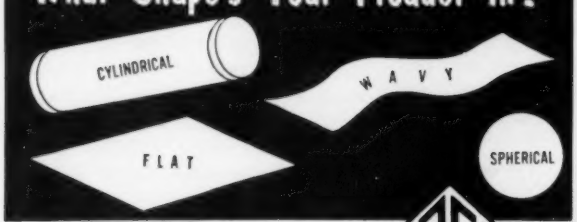

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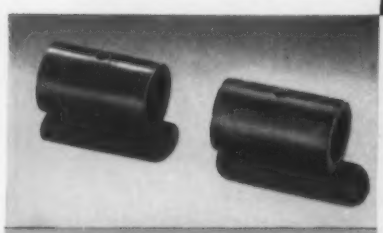

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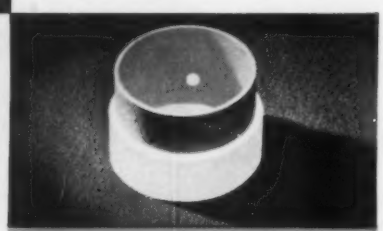
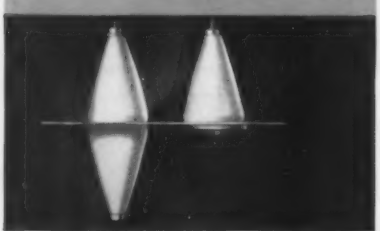


Anode Shield used in ultra high frequency electronic systems demonstrates original U.S.G. technique of molding TEFLON around metallic structures.



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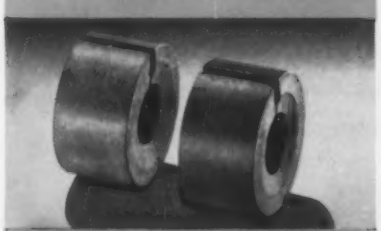

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In use, the mold pieces are slipped onto the ends of the wire, the insulation penciled down, and the spring connector turned on with the fingers. After pulling the vinyl mold units into place over the connection, the inner partition in the plastic bag is ruptured by squeezing, the resin and hardener are mixed together, and the activated resin is then poured into one of the spouts on the mold. The resin sets up within 5 to 15 min., depending upon the temperature. The plastic mold is left in place.

The epoxy resin has a dielectric strength of 800 v. per mil thickness in 10-mil films; an electrolytic corrosion factor of 1.0; a dielectric constant and dissipation factor at 30° C. of 7.2 and 0.019, respectively; and good resistance to water, oil, solvents, and weathering.

CREDITS: "Scotchcast" splicing kit is supplied by Minnesota Mining and Mfg. Co., St. Paul, Minn.

To make splice, epoxy resin is poured into vinyl mold slipped over connector

Napkins are automatically ejected from styrene dispenser one-at-a-time

Napkin Dispenser

JUST like an automatic toaster pops up bread slices, an automatic paper napkin dispenser molded of high-impact styrene is designed to pop up napkins one-at-a-time as they are needed, thus eliminating all the fuss and waste that is associated with hand-separating the wanted number of napkins.

The two-piece Snap-A-Nap dispenser—consisting of the main front housing and a down-swinging hinged back—is molded in a 2-cavity mold mounted in a 12-oz. press. Integral pins molded into the base of the main housing snap into two holes molded into the bottom of the back piece for the hinging action.

An open decorative tulip shape, which enables the housewife to see at a glance whether her supply of napkins is running low, is molded into the front and back surfaces of the dispenser. A styrene napkin ejector also molded in the shape of a tulip completes the very attractive Holland motif.

When the dispenser is to be used, this ejector which runs up and down a slot molded into the front of the housing, is simply depressed and released. A spring loading clip attached to the other end of the ejector automatically advances the napkins into ejecting position and pops them out one-at-a-time.

The 7-oz. dispenser measures 7 by 7 by 3 in. and is designed to hold a full box of any of the standard sizes of napkins.

CREDITS: Dispenser is molded by Northeastern Plastics, Inc., Boston, Mass., using high-impact styrene supplied by Monsanto Chemical Co. and The Dow Chemical Co.

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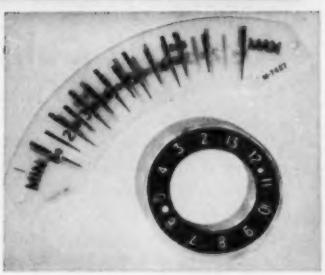

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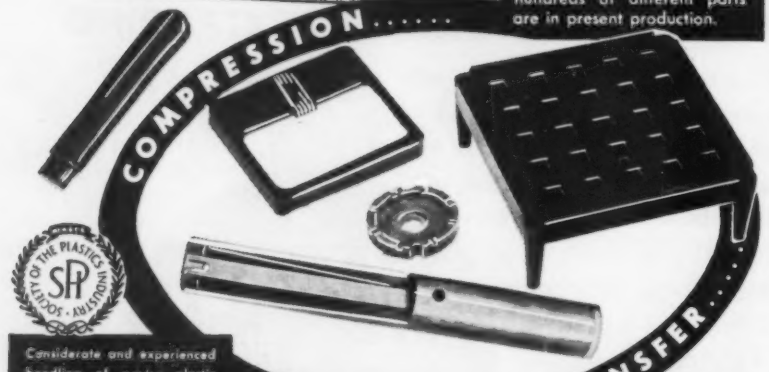

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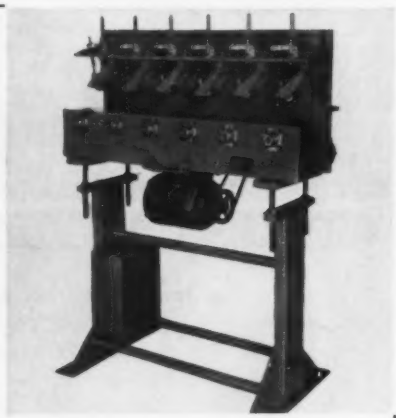

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Foams

(*From pp.* 106-108)

the head of a molded styrene handle.

For more difficult cleaning jobs, such as on greasy hands, American Collo plans to market a rigid type of sponge that will serve as a slight abrasive without causing damage to the skin. Although such sponges will remain rigid in cold water, they soften when hot water is applied.

New Products

Although household sponges will form a major part of American Collo's products, several different types of items that will touch on other phases of consumer and industrial life are already in prospect. Included among these are: a clothes brush consisting of a block of polyurethane foam glued to a molded styrene base; a face-cleaning sponge flocked on one side to serve as a powder puff; and a tooth brush with an expanded polyurethane foam head and a molded styrene handle. The latter product will be made available with filler cartridges containing extra foam heads that may be inserted in the brush as needed.

The fact that polyurethane foam can easily be molded into a desired shape also opens new opportunities for the material in the fields of molded toys, pillows, lampshades, curtains and drapes, Christmas tree decorations, seat cushions, and decorative partitions. There is talk of its use as a cigarette filter, since it it claimed to remove organic tars and nicotine, but will not take up moisture like cotton or paper. It can also be adapted by the garment trade for millinery accessories, beltings, dress trimmings, and ladies' handbags. In this category, one of its biggest applications is expected to be molded shoulder pads that can be sewn directly into a dress, without requiring fabric covering such as would be needed for foam rubber. Because of the high tensile strength of polyurethane foam, the threads used for sewing the pad in place will not tear through the material. The foam is also resistant to most cleaning fluids, including gasoline, permitting the pads to remain in the dress while it is being dry-cleaned.

For decorative effects, the polyurethane foam is available in a

wide selection of colors, ranging from light pastels to dark shades. Open-cell, semi-translucent sheets of the material with a decorative lace or other fabric inserted between them can also be laminated together.

Upholstery

On the other hand, the "polyester" foam material being sold by Hudson Foam Plastics has thus far been given special attention in the consumer upholstery and bedding fields, as well as in the industrial markets. Like the American Collo product described above, Hudson's polyester foam is reported to be unaffected by oils, greases, gases, most cleaning fluids, sunlight, uric acid, perspiration, salt water, and lacquer. In addition, it is claimed that it will not oxidize, rot, decompose, or shred; that it is mothproof, verminproof, and moldproof; that it is odorless; and that it is washable in soap and water. The flame-retardant foam will not support a flame and has a melting point well over 450° F.

Since one of Hudson's foam's primary applications is expected to be in cushioning, bedding, and furniture upholstery, many of the physical characteristics of the material are reported as they compare to those of foam rubber, its principal competition in this field. Hudson claims, for example, that in addition to being much stronger than foam rubber, the porous polyester foam, has twice the cushioning resistance and is ½ the weight of like thicknesses and sizes of low-density foam rubber. A ½ in. thick piece of foam, therefore, will supposedly have twice the contour cushioning effect of a 1 in. thick foam rubber sheet. The amount of closed and open cells in the foam can be varied to provide different degrees of porosity and absorbency.

As a result, when using the new foam for bedding, sleeping surfaces of only 1½-in. thickness above the foundation are considered sufficient for comfort. Bedding made from the foam is also claimed to be an excellent thermal insulator. A major mail-order company has already listed in its catalog, under Hudson's trade name, a foam topper, ¼ or ⅜ in. thick, to be placed over a conventional mattress for extra comfort.

In cushioning applications, the new foam has much to offer. Because of its strength—Hudson claims it has four times the tensile strength of foam rubber—the material requires no protective covering. Silk screening directly onto the surface of the foam cushion can add any decorative effect that might be required.

More important, however, where any sort of fabric or plastic film covering is desired, is that such a cover can be sewn onto the cushion using an ordinary sewing machine. With foam rubber cushions, this would be impossible since the rubber would shred or would melt under the heat generated by the needle. In contrast, once the cover has been sewn onto the polyester foam cushion, it will remain securely and permanently in place and, since the foam is not affected by most cleaning fluids, does not have to be removed even for cleaning.

Packaging Applications

If plastic covers are to be used on cushions, or on such bedding applications as crib mattresses, they can be heat sealed directly onto the polyester foam. Since there is no

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plasticizer migration in the foam, it can be used in direct contact with vinyl film without affecting it in any way.

This characteristic of the new foam opens up another possible outlet for the material in the packaging field. Hudson suggests the use of the foam as a packing material for delicate electronic instruments. Such instruments can be snugly placed between two sheets of polyester foam which will absorb shock or vibration. Vinyl film placed completely around the foam and heat sealed to it would serve as additional protection against dust or dirt.

Other applications for which the polyester foam is setting its sights includes insoles for shoes, acoustical insulation, heat and cold insulation, under-carpet cushioning, gaskets, and various types of industrial filters.

One of the more recent applications which Hudson has put on the market is a flame-retardant ironing board replacement pad fabricated of the new foam. Unaffected by heat, the pad provides a resilient base that does not mat down and will last almost indefinitely. Besides providing a smooth surface over which the iron can glide effortlessly and quietly, the polyester foam has little compression set and will keep its original shape even under the pressures exerted against it during ironing. The pad is cut by Hudson to the length and width of the standard ironing board and packaged in a polyethylene bag.

The polyester foam is available to manufacturers from Hudson in molded sheets up to 54 in. wide and 7 in. long and in continuous rolls. Thickness ranges from $\frac{1}{8}$ to 4 inches. Other sizes can be custom made on contract.

And Tomorrow?

The future for the very versatile new polyurethane foams has attracted a great deal of attention from the plastics industry. It is reported that several companies other than the two mentioned above already have formulated plans for production of similar foams, including Curtiss Wright Corp., B. F. Goodrich Co., and The General Tire & Rubber Co.—but who the other potential suppliers are and what their plans consist of no one is prepared to say.

It seems likely that by the time this article appears in print, several new products using similar foam materials—whether they be called expanded polyurethanes or expanded polyesters—will have appeared on the market. With so many eyes focused upon them, the family of polyester-isocyanate foams appears to be in that typical state of confusion that usually accompanies the birth of a new and rapidly expanding industry.

Any sizable production of the foam seems many months away and any large-volume introduction of the applications described above also seems reserved for some future date.

From the confusion, however, a pattern is beginning to emerge. On the basis of the many advantages of this family of foams, it seems unlikely that any of the various forms of polyurethane foams are going to be denied an important position in the growing family of plastics foams—not as competition in those specialized fields which today's plastics foams service but as another means for expanding the general market areas for all plastics foams.—End

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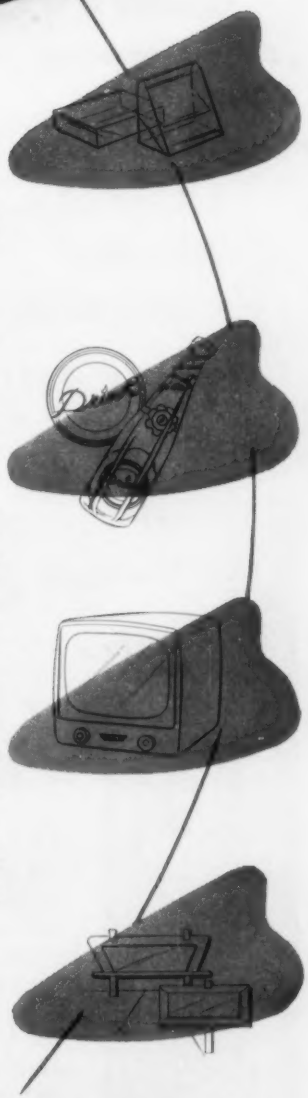

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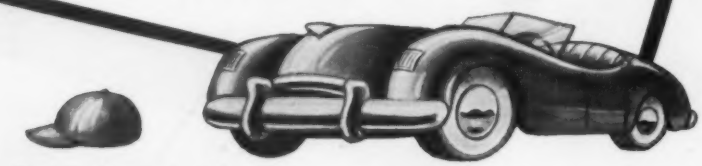

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Acrylic Lighter

(*From page* 109)

major problems to be overcome in the molding of these parts, particularly in view of the fact that some of the wall sections in the base of the body portion are as much as ⅝-in. thick. Air bubbles and other internal imperfections cannot be tolerated in the lighter because all the colors used are transparent, which means that bubbles would show up like a flaw in a plate glass window. This problem was solved by providing adequate molding pressure, closely regulated mold temperature control, and proper mold venting.

From the molding standpoint, the most unusual feature of the Masonlite lighter is the intricate coring of the body section. To produce the internal wick chamber and the fuel reservoir, the body is molded with two parallel cores having ½-in. openings at the bottom into which the fuel plugs screw. The reservoir, which holds a reserve supply of lighter fluid, terminates a short distance from the top of the lighter, while the wick chamber narrows to a smaller core which passes through the top surface. The wick of the lighter passes through this opening and is held in place by a short metal collar which extends through the sheet metal stamping that covers the top of the lighter beneath the hinged upper section.

The other principal core in the body of the lighter passes horizontally through the fuel reservoir and leads into the wick chamber via a small opening. By backing off the threaded metering plug which screws into this core from the side of the lighter, reserve fuel is readily transferred into the wick chamber.

Cam Operated Cores

Coring of the body section is accomplished by means of cam operated cores in the mold. When the mold closes, the two vertical cores move into position; then, before the material is injected into the die, the side core moves forward, passing through a round opening in the reservoir core pin and contacting the wick chamber core pin. Following injection, the short side core pin withdraws first, and then the two vertical pins. Extremely close die work and accurate timing are nec-

essary to produce the clean-cut intersecting cores and to avoid pin breakage.

The four smaller cores in the main body of the lighter are also made by cam actuated core pins. Two of these cores run in a vertical plane; one goes across the narrow dimension of the part, near the top; the fourth extends horizontally across the width of the piece. Of the latter two openings, the first is to accommodate the hinge pin for the acrylic flip-up top of the lighter. Directly beneath it is the blind core in which a spring-loaded metal plunger is inserted which causes the top to flip upward when lifted slightly and also holds it firmly in either of three positions—closed, vertical, or folded back 180 degrees. This is made possible by molding the hinged end of the top with a bottom notch which acts as a cam when rotated against the spring-loaded plunger. The other vertical core is for mounting the spark wheel, which nests horizontally in a notch molded at the top of the body portion. Terminating within this notch is the remaining horizontal core, in which the flint is inserted, with a compression spring behind it to hold it in close contact with the spark wheel.

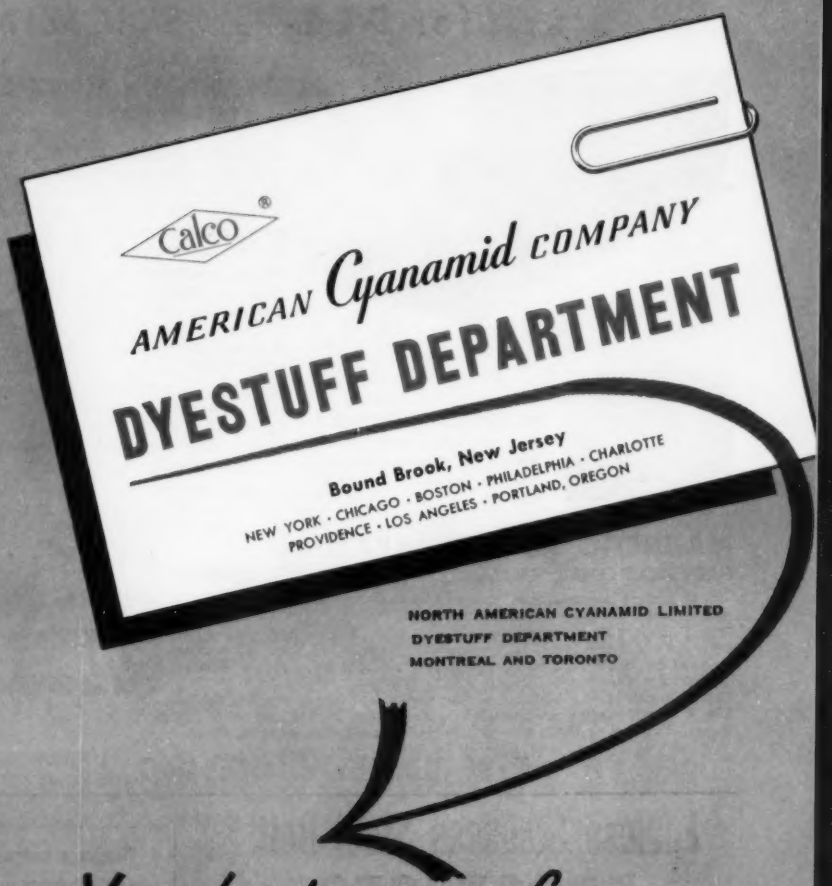
Split Cavity

Male threads on the two fuel plugs and the fuel metering plug are integrally molded and are produced by a split cavity arrangement in this section of the mold. All three plugs have "coin slots" in the head portion so they may be conveniently tightened or removed by inserting a dime or penny into the slot. The metering plug, longest of the three, has an extended shaft at the end which passes through the reservoir and seats against a gasket.

The flip-up top of the lighter is molded with a blind round cavity on the underside which caps the wick and prevents fuel evaporation. The end of this part is also grooved out to accommodate the edge of the spark wheel.

In addition to molding and assembling the lighter, the molder also performs the final packaging operation on these products, shipping them directly to the customer for distribution through retail outlets.

CREDITS: Lighters molded and assembled by Santay Corp., Chicago, using Du Pont's Lucite acrylic molding material.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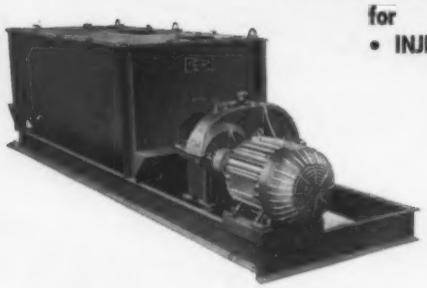

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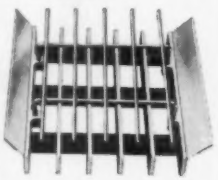

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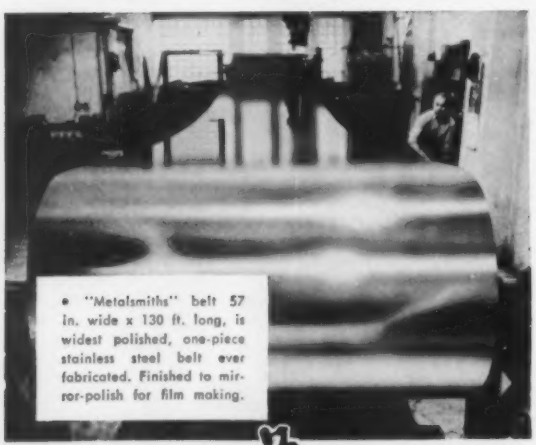

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Plastics in Clocks

(*From pp.* 102-104)

use plastics is the sophisticated "Innovation," described as one of the first free-hanging mobile clocks in clock history. "Innovation" is suspended from the ceiling by a nylon hanging cable and is dressed up with molded styrene numerals. To lock these numerals in place, a molded-in stud at the back of each one is slipped into a hole in the clock face and crimped with a hot plate at the other end into a rivet-like shape.

Animated Clocks

Another unusual series of clocks that make effective use of plastics materials are the animated action clocks offered by Mastercrafters Clock and Radio Co., Chicago, Ill. These clocks incorporate molded styrene figurines or miniature settings which revolve, turn, or move in some way while the clock is in operation.

Latest addition to the line, which already includes such popular numbers as "Swinging Children" and "Merry-Go-Round," is "The Fireplace." The 10½ in. high one-piece case, in mottled walnut finish, for "The Fireplace" is molded of cellulose acetate supplied by Eastman Chemical Products, Inc., and selected for this application because, in addition to its durability and ease of molding, it can provide practically any mottled graining effect, including onyx and mahogany as well as swirl walnut. To achieve this effect two different colors of acetate with different flow hardnesses are mixed together in the proper proportions.

The 12-oz. one-piece case, which includes an opening for the clock face, a decorative circular supporting base, and molded-in bosses for assembling the metal back to the plastic housing, is molded in a single-cavity mold in a 16-oz. machine by Breyer Molding Co., Chicago, Ill. When the miniature styrene grate, andirons, and logs have been cemented into a nook in the acetate case and the clock plugged in, a painted revolving drum illuminated from within rotates to give the impression of realistic tongues of flame flickering in the open hearth fireplace.

Plastics also play an important

role in the design of the "Moonbeam" electric alarm, a product of Westclox Div., General Time Corp., La Salle, Ill. The "Moonbeam" is an unusual type of alarm clock. When the hour for which the alarm is set is reached, a light inside of the case begins to blink on and off. If this doesn't wake the sleeper after a few minutes, an audible bell alarm goes off.

Butyrate Case

The one-piece case for the "Moonbeam" is molded by Chicago Molded Products Corp., Chicago, Ill., using cellulose acetate butyrate supplied by Eastman Chemical Products, Inc. To provide for optimum light transmission where needed, the translucent case is molded with a vertically fluted section at the edge of the case where the light is installed. Before final assembly, the entire case, with the exception of the fluted section, is painted on the inside to make it opaque.

Because the flutings are on the plunger of the mold, the ridges naturally are on the inside surface of the case, plainly visible through the translucent material to lend a decorative touch to the handsome clock. At the same time, since they are on the inside of the case, the outside of the unit presents a completely smooth, easy-to-clean surface, with no hiding places for dust or dirt.

Three metal threaded inserts, which are used in assembling the clock to a gold-colored metal base, are molded into the foot of the butyrate case. Two of these inserts are located in bosses placed at the radii of the case, where there is less danger of sink marks, while the third, for the same reason, is located directly opposite a decorated section of the case.

After molding, only the sprues need be removed and a small amount of flash trimmed off to make the case ready for assembly.

The "Moonbeam" alarm clock, as well as the few other clock models described above, are only a handful of the plastics clocks on the market today. They do serve to illustrate, however, why clockmakers have turned so emphatically to plastics —and, more important, why this trend is expected to continue, in ever-increasing volume, for many years to come.—END

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100 East 42nd Street, New York 17, N.Y.

Case History

(*From pp.* 125-128)

the mold opens, knock-out pins push the molded part from the cavity upward until it is suspended just above the top of the loading space. The operator then removes the part from the knock-out pins (Fig. 5), cleans the excess flash from around the cavity and force plug by air, and loads the mold for the succeeding shot.

This particular molded part has an average wall section of approximately ½ inch. With the mold temperatures previously stated, and without preheating, cure time is only 2¾ minutes.

Thin Flash

In the production of the terminal block, filing of the flash from the parting line (Fig. 6) follows the molding operation. Because of the excellent mating of the mold parts, the flash is very thin, and the operator has no difficulty in producing a smooth finish with a standard mill bastard file.

Two additional operations are required in the molder's plant before the blocks are shipped to the customer. Three mounting holes are jig-drilled, as shown in Fig. 7; then the thin flash in the terminal strip mounting holes is pierced.

The brass terminal strips are assembled in the customer's plant. To perform this operation the operator places one brass strip between each pair of barriers in the molded piece and places a special jig on top of the part to hold the terminal strips in position. The assembly is then inverted and the operator drops mounting screws into each of the holes, Figure 8. The assembly is completed by "running-up" the screws with an electrically operated screw driver, as in Figure 9.

Potentials

The terminal block application just described serves to point up the possibilities of this new melamine-glass material where molded plastics parts with exceptional electrical and mechanical properties are required. At the present time, production volume of the compound is limited but plans for the future indicate that manufacturing facilities should soon be able to fill all demands.—END

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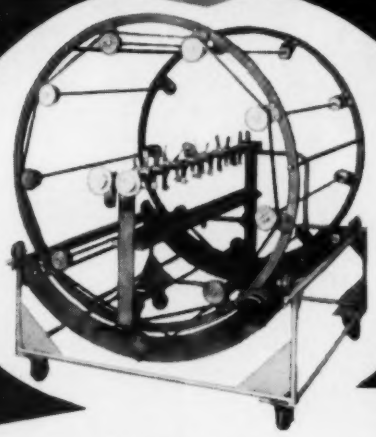

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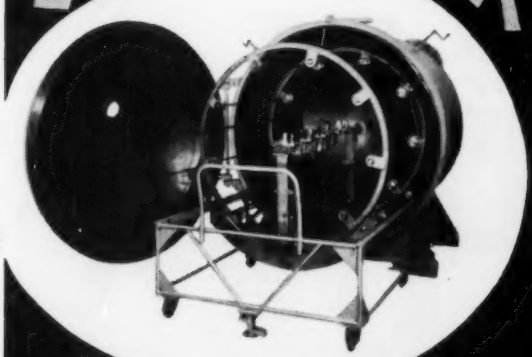

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FULLY AUTOMATIC INJECTION MACHINE. Detailed information on the advantages and operation of the "Cylector" 2-oz. and 4-oz. fully automatic injection machines, eight of which can be operated by a set-up man and a powder boy. Guy P. Harvey & Sons. (K-402)

ADHESIVES GUIDE. Chart lists 25 surfaces, plastic and otherwise, and indicates the adhesive needed to bind one to another. Industrial Plastic Service and Supply Company. (K-403)

GRANULATOR. Leaflet illustrates new grinder designed for fast cleaning. Gives complete specifications and describes how hopper and screens may be rapidly removed for cleaning. The DeMattia Machine & Tool Company. (K-404)

ACETATE MOLDING POWDER. Leaflet on thermoplastic compounds for injection and extrusion molding lists five grades. Includes flows available and recommended flow temperatures. Properties chart gives complete specifications. American Molding Powder & Chemical Corp. (K-405)

ELECTRICAL EMBEDMENT RESIN. Data on "Scotchcast" thermosetting hot pouring and cold pouring epoxy type potting resins for electrical insulation. Minnesota Mining & Mfg. Co. (K-406)

PLASTICS PIPE. Technical bulletin on the advantages, chemical and physical properties of pipe and fittings made from "Kralastic" acrylonitrile copolymers. Naugatuck Chemical, Division of U.S. Rubber Co. (K-407)

"FIBER-GLASS" YARNS. Booklet tells the story of "Fiber-Glass" yarns, how they are made, where they are used. Yarn composition table gives specifications, including yards per pound, minimum breaking strength, yarn diameter for 60 different yarns. Libbey-Owens-Ford Glass Company. (K-408)

VACUUM FORMED TRAYS. Data on a service which custom vacuum forms trays, containers, and contour packages for simplified handling of a multitude of small and irregularly shaped parts. Gregstrom Corp. (K-409)

MOLD PLANT FACILITIES. Booklet tells how this company injection and compression molds. Lists machinery, engineering facilities, finishing equipment, etc. Consolidated Molded Products Corp. (K-410)

SLAT EXPANDERS. Bulletin explains how Progressive anti-wrinkle slat expanders are used to eliminate wrinkles from plastics films by applying a smoothing, spreading action during continuous roll operations. Progressive Machine Company, Inc. (K-411)

WEIGH FEEDER FOR INJECTION MOLDING. Folder explains the advantages of weigh feeding of injection molding machines in order to save material and labor, improve product quality, and increase molding speed. Diagram shows feature of Exact Weight unit for this purpose. The Exact Weight Scale Company. (K-412)

PIGMENTS FOR VINYLS. Data bulletin describes Burgess Pigment No. 30 and Burgess Iceberg Pigment as used in the manufacture of insulated wire and cable, vinyl sheeting, synthetic rubber gaskets. Lists also their chemical, physical and electrical properties. Burgess Pigment Co. (K-413)

VACUUM METALLIZING. Brochure shows how vacuum deposition of a thin coating of metal can, at low cost, supplant other metal finishing processes on a wide variety of products. Specifications for Stokes vacuum metallizing chambers in various sizes. F. J. Stokes Machine Company, Inc. (K-414)

PRODUCTION TAPPING OF SMALL HOLES. Specifications on the Hamilton super-sensitive tapping machine for simple, precision production of small holes in all types of molded and formed plastics. The Hamilton Tool Co. (K-415)

CYLINDERS FOR AUTOMATION. Pamphlet highlights the advantages of standardization of hydraulic and pneumatic cylinders for automation and other heavy duty service. Drawings show critical mounting dimensions. Gives internal fluid pressure stresses of essental components, and other interesting data. Miller Fluid Power Company. (K-416)

"HEAT SEALING DIGEST." Current issue of this house organ contains articles on what to look for when purchasing an electronic heat sealer, on technical tube data and its meaning, on setting up and maintaining sealing dies and on a clicking die press. Kabar Manufacturing Corporation. (K-417)

AUTOMATIC MILLING MACHINE. Detailed description of the features and operations of the No. 2-24 series automatic milling machines manufactured by Cincinnati Milling Machine Co. (K-418)

ORGANIC CHEMICALS. Brochure covers solvents, industrial chemicals, and resins and plastics. Describes and gives specifications of polymerization catalysts, resin intermediates, surface coating materials and thermosetting resins. Shell Chemical Corporation. (K-419)

MOLD TEMPERATURE CONTROL. Brochure describes automatic "Thermolator" controls for regulating mold temperatures by means of high velocity circulation water. Sketches show preferred mold temperature control methods. Industrial Manufacturing Corporation. (K-420)

PLASTICIZERS. Brochure presents specifications on twenty-one "Harchem" plasticizers for vinyls, cellulosics, styrenes, and other thermoplastics. Chart compares physical properties of each and shows the resins with which they are compatible. Hardesty Chemical Division, W. C. Hardesty Company, Inc. (K-421)

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EXTRUSION MACHINES. General description and technical information on a thermoplastics extruder with a screw diameter of 30 mm. Information on available cross heads and dies for blowing film. A. Reifenhauser. (K-425)

STABILIZERS FOR RIGID POLYVINYL CHLORIDE. Data sheet on stabilizer formulations found most suitable for use with clear-rigid vinyls. Advance Solvents and Chemical Corporation. (K-426)

ADHESIVES FOR WEB LAMINATION. Manual lists 26 laminatable materials and indicates the proper "Bondmaster" adhesive to use to laminate each to itself or to any of the others. Materials covered include cellulose acetate, polyethylene, polystyrene, saran, vinyl, "Mylar," cellophane and aluminum foil. Rubber & Asbestos Corporation. (K-427)

PROCESSING EQUIPMENT. Catalogue reveals complete data on compounding-extracting-extruding units designed for maximum output. Details on patented dual worms, built in sections for easy replacement. Chart contains full descriptive data. Welding Engineers, Inc. (K-428)

INJECTION MOLDING MACHINE. Circular covers the specifications and features of the Reed-Prentice 175 T-4/6 ounce plastic injection molding machine. Reed-Prentice Corporation. (K-429)

DRY BLENDER. Specification sheet on the "Pico" blender for rapid, even mixing of dry colorants with thermoplastic resins. Plastic Molders Supply Company, Inc. (K-430)

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REINFORCED PLASTICS PRESS. Specifications and features of five models of a hydraulic press specially designed for molding of low-pressure reinforced plastics are contained in a bulletin issued by Baldwin-Lima-Hamilton Corporation. (K-434)

MASK WASHING MACHINES. Leaflet on two machines for fast cleaning of electroformed and other spray masks list specifications and explains method of use. Conforming Matrix Corporation. (K-435)

PLASTICIZER SELECTION CHART. Handy chart indicates recommended Baker plasticizers for cellulose, vinyl, and other resins. The Baker Castor Oil Co. (K-436)

"NADIC" ANHYDRIDE. Technical bulletin on the physical properties, chemical reactions and suggested uses for this chemical, with potential use in polyesters, organic coatings, resins and plasticizers. National Aniline Division, Allied Chemical and Dye Corporation. (K-437)

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HEAT SEALING PRESSES AND GENERATORS. Bulletin contains specifications and features of two Mayflower set-ups for efficient high frequency sealing of vinyl and other thermoplastics. Mayflower Electronic Devices, Inc. (K-441)

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VACUUM FORMING MOLDS. Data on the advantages of "Chro-Mold" chromium molds for vacuum forming. Chart compares operating cost and life expectancy of this type mold with cast aluminum, machined metal, plaster and wood molds. Vacuum Sales Company. (K-443)

MILLS. Data on various "Emco" mills, from laboratory size to 84 inches, for intensive mixing and blending of plastics resins and constituents. Erie Engine Mfg. Co. (K-444)

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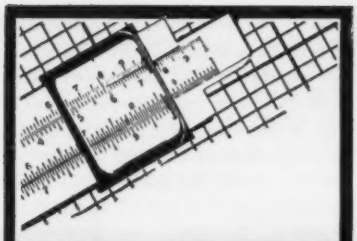

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Dust Problems

(*From page* 129)

wise physiologically harmful in the materials with which they are working. In occasional instances there may be sufficient irritation to indicate that an operator should be transferred from this work to other activities, but generally such a transfer will be more psychologically than physiologically based.

Fifth, certain of the commercially available protective "creams" have been found somewhat helpful, although as a rule the operators use such things only temporarily, when they are first working with reinforced plastics.

Sixth, simple vacuum exhaust systems should be used around machining operations to carry away dust developed. Frequently an ordinary household vacuum cleaner is all that is necessary. Blanking and shearing normally do not require any such precaution nor is it usually necessary for short run setups. However, when sawing, milling, drilling, and similar operations are to be undertaken, the machines to be used should be equipped with such an exhaust system and care should be taken to see that the suction nozzles are properly designed and placed to collect a major portion of the dust produced. On the other hand, an exhaust system will be unnecessary if the equipment and work is such that the operation can be conducted under a stream of water or other coolant.

Seventh, sometimes the irritation problems involved carry along to subsequent assembly operations because of dust adhering to fabricated parts. This condition can generally be eliminated by dip washing of the part in a very thin solution of some common liquid wax and a convenient solvent such as naphtha. This can be accomplished most economically by batch dipping in wire baskets.

In summary, it should be emphasized that although extensive investigation by medical authorities has established that such skin irritations as may occur from working with reinforced plastics are superficial and transitory, personnel problems can be very real unless certain reasonable precautions such as those outlined above are observed.—End

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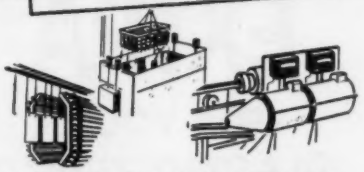

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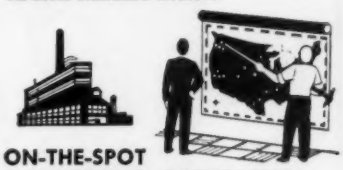

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Radiation Fields

(*From pp.* 131-142)

gamma energies of the fission products amount to about 5% of the total energy of fission, and these are released gradually throughout the decay periods.

While the fission product energy is distributed among 20 different elements, about 20% of it is in the gaseous fission products, krypton and xenon for about 1 min. after fission. Thus, if the reactor fuel is a fluid from which these gases could be continually stripped, transferred, and trapped in a gamma irradiator within 1 min., about 1% of the total reactor power would be available for irradiations when the xenon and krypton are in equilibrium with their daughter nuclides. Initially this equilibrium would be achieved in 2 wk., and the gamma irradiator would then maintain a constant power level.

Figure 5, p. 142, shows the layout of such a proposed irradiator; this could be used in connection with reactors whose main objective is power, although it has been calculated that it would be economically feasible to construct such a reactor with the generation of gamma power as the prime end.

It seems reasonable to expect that a reactor and gamma irradiator of this type could be mounted on a railroad car and moved directly into a chemical plant. Such a setup is proposed in Figs. 6 and 7, p. 142. The reactor would take up approximately a 10-ft. section of the railroad car, while the irradiation unit would consist of a slab bisecting the rest of the car in which the fission gases would be trapped. Before operation the reactor would be moved into a tunnel whose walls would provide the secondary shielding required. The beta-gamma shield for the slab source, consisting of two head walls on either side of the slab, would be removed. In place the box would bayonet into a monorail system on which material to be irradiated could pass through a labyrinth entrance in and out of the irradiation chamber. A control station, a stack for cooling air and gaseous waste, and a supplementary neutron shield would be required to put such a reactor into operation. With a little imagination this scheme could be adapted to fit a number of chemical processes.

Irradiation Economics

Manowitz (44) has attempted to give some kind of idea of the economics of gamma irradiators in the field of chemical reactions. This is difficult, both because the cost of a reactor is not established and the data on chemical reactions is extremely preliminary. He has set two criteria for such a study. Since the construction of a commercial nuclear reactor is undoubtedly a high-risk enterprise, there must be a high rate of profit and a short amortization period for the investment. In the analysis an amortization period of 5 yr. and a profit rate of 33⅓% was assumed. It was also estimated that \$300-\$500/kw. costs of reactor heat power are attainable. Table III gives a comparison of the worth of various applications of ionization power based on profit potential.

If one assumes that it would be

Table III—Applications of Ionization Power and Profit Potential

Product	*Production rate for typical plant*	*Irradiator ionizing power*[a]	*Value of treatment or operation per lb.*	*Total investment allowable*	*Reactor plus investment potential*
		kw.	*\$/lb.*	*10^6\$*	*\$/kw. heat power*
Polystyrene	2000 lb./hr.	50	0.01	0.7	140
Polystyrene	2000 lb./hr.	50	0.01	0.7	140
methacrylate	2000 lb./hr.	6	0.01	0.7	1100
Polyethylene	2000 lb./hr.	100	0.31	5	500

[a] Assumes 25% efficiency

worth one cent per pound to initiate polymerization of styrene (an optimistic assumption), then one would be willing to invest $700,000 in a 50 kw. facility for processing 2000 lb./hr. of styrene. However, this facility merely replaces a few tons of catalyst per year plus a standard reaction vessel, and would hardly be worth such an investment. Similar reasoning applies to the case of polymerizing methyl methacrylate even though the reaction is more efficient and the investment potential appears high. If the polymer had more useful properties than the commercial variety, however, such a venture might be attractive.

The case of polyethylene is a more practical example. Polyethylene is made today in equipment operated at ultra-high pressures, and the amortization of this equipment is a major factor in the cost of today's product. It has been demonstrated, however, that ethylene can be polymerized in a gamma field at much more moderate pressures. A value amounting to 30¢/lb. for polyethylene was obtained by taking the difference between the present market price of the raw material and the product, and subtracting a third of the difference for profit. On this basis it would appear that a low-pressure plant for the production of 2000 lb./hr. of polyethylene would be worth a $5 million investment. The investment potential of $500/kw. indicates that it should be feasible to use known reactor technology for such purposes.

Accelerator Irradiators

Nothing has yet been said about the role of accelerators in this field of industrial irradiation chemistry. The research data reviewed indicate that the effects produced by ionizing radiation from accelerators are similar to those obtained with gamma sources. While it is, of course, difficult to make any conclusive predictions as to whether accelerator irradiation or gamma irradiation will play a greater part on an industrial scale, it is nevertheless possible to make comparisons between the two.

Accelerators and X-ray machines can deliver a very high dose in a matter of seconds, whereas gamma irradiators of the type discussed might require hours for an equivalent dose. The machines can be turned off when not in use, while the

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gamma irradiator presents an ever-constant safety problem. Machines are handicapped in that they are weakly penetrating and have a restricted field, whereas gamma irradiation can be used to treat large bulky materials. As a consequence, machines are limited to treatment of materials in thin sheets and of small dimensions. On the other hand, machines require maintenance due to failures and breakdowns, and maintenance on a gamma source is no problem. Machines involve known technology and will probably be available in the $50,000 to $100,000 investment range, whereas fission products or reactors when available will probably involve investments of a factor of 10 higher.

Any use of ionization power in the plastics field will, of course, have to be studied in the light of the respective advantages of gamma irradiators versus machines. For the present there is a mountain of chemical research that must be undertaken before this choice becomes a problem of significance.

References

1. Thenard, P., Compt. rend. *78*, 219 (1874).

2. Mund, W., and Koch, W., Bull. Soc. Chim. Belges *34*, 125, 241 (1925).

3. Lind, S. C., and Bardwell, D. C., Science *62*, 422 (1925).

4. Coolidge, W. D., Science *62*, 441 (1925).

5. Hopwood, F. L., and Phillips, J. T., Proc. Phys. Soc. (London) *50* 438 (1938).

6. Hopwood, F. L., and Phillips, J. T., Nature *143*, 640 (1939).

7. Dainton, F. S. Nature *160*, 268 (1947).

8. Dainton, F. S., J. Phys. and Colloid Chem. *52*, 490 (1948).

9. Dainton, F. S., J. Chim. Phys. *48*, 182 (1951).

10. Dainton, F. S., J. Chem. Soc. 1533 (1952).

11. Chapiro, A., Compt. rend. *228*, 1490 (1949).

12. Ibid., *229*, 827 (1949).

13. Chapiro, A., J. Chim. Phys. *47*, 747 (1950).

14. Chapiro, A., Compt. rend. *233*, 792 (1951).

15. Ballantine, D. S., and Manowitz, B., B.N.L. *229* (T-35). Mar. 1953.

16. Bernstein, I. A., Farmer, E. C., Rothchild, W. G., and Spaulding,

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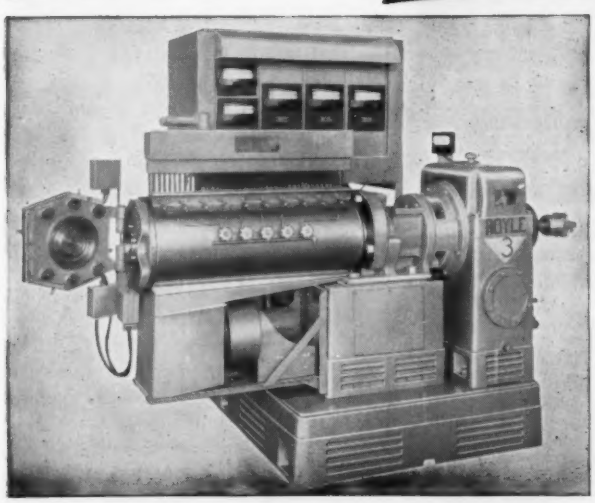

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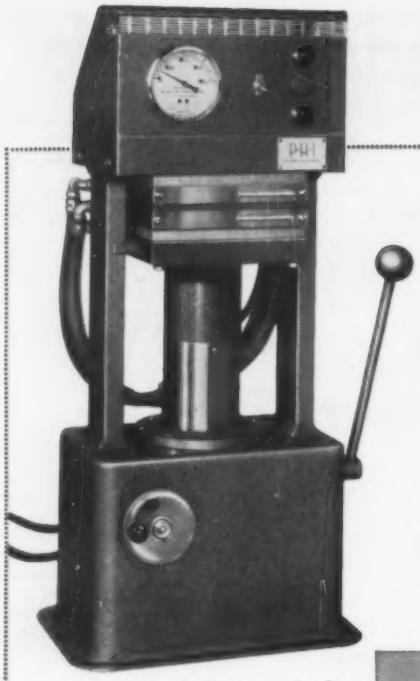

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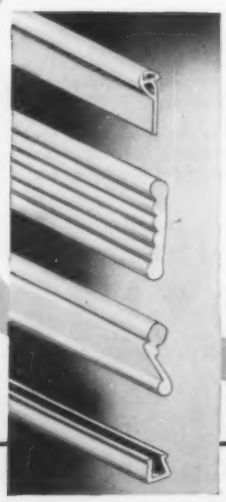

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F. F., Journal of Chem. Phys. *21*, 1303 (1953).

17. Ballantine, D., et al., unpublished results.

18. Mesrobian, R. B., Ander, P., Ballantine, D., and Dienes, G. J., J. Chem. Phys. *22*, 565 (1954).

19. Bretton, R. D., et al., N.Y.O. 3310, July 25, 1952.

20. Ibid., N.Y.O. 3311, Oct. 30, 1952.

21. Ibid., N.Y.O. 3312, June 30, 1953.

22. Martin, J. J., et al., C.O.O. 124, 33-4, Mar. 1953.

23. Ibid., C.O.O. 196, 21-6, Sept. 1953.

24. Majury, T. G., unpublished results.

25. Schmitz, J. V., and Lawton, E. J., Science *113*, 718 (1951).

26. Seitzer, W. H., Goeckermann, R. H., and Tobolsky, A. V., J. Am. Chem. Soc. *75*, 755 (1952).

27. Mund, W., Herman, J. A., and Verfaillie, G., Bull. Acad. Royal Belges *35*, 656 (1949).

28. Mund, W., and Herman, J. A. Bull. Acad. Royal Belges *37*, 333 (1951).

29. Mund, W., Herman, J. A., and Huyskens, P., Bull. Acad. Royal Belges *37*, 696 (1951).

30. Mund, W., Van Meerssche, M., and Monigny, J., Bull. Soc. Chim. Belges *62*, 109 (1953).

31. Landler, Y., and Magat, M., Compt. rend. *226*, 1320 (1948).

32. Landler, Y., and Magat, M., Bull. Soc. Chim. Belges *57*, 381 (1948).

33. Sisman, O., and Bopp, C. D., O.R.N.L. 928, June 1951.

34. Bopp, C. D., and Sisman, O., O.R.N.L. 1373, July 1953.

35. Charlesby, A., A.E.R.E. M/R-928, July 1952.

36. Byrne, J., and Mann, W. L., K-981, Nov. 1952.

37. Charlesby, A., and Ross, M., Nature *171*, 1153 (1953).

38. Lawton, E. J., Bueche, A. M., and Balwit, J. S., Nature *172*, 76 (1953).

39. Charlesby, A., Proc. Roy. Soc. (London) *215A*, 187 (1952).

40. Dole, M., Chem. Engr. News *32*, 1342 (1954).

41. Ballantine, D., et al., J. Poly. Sci. *13*, 410 (1954).

42. Manowitz, B., Nucleonics *9*, No. 2, 10 (1952).

43. Manowitz, B., Nucleonics *11*, No. 10, 18 (1953).

44. Manowitz, B., unpublished results.—END.

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Rigid Sheeting

(*From pp.* 144-148)

the heat-resistant type started to shrink too, as shown in Fig. 5B. The percentage of shrinkage at this higher temperature corresponds to the shrinkage of the standard type at the lower exposure temperature.

From the viewpoint of strength, a low forming temperature, and from the viewpoint of shrinkage, a high forming temperature appears to be desirable. A compromise has to be made between these two properties. An optimum forming temperature of 160 to 180° C. may be recommended for high-impact styrene sheets. This condition is obtainable for an 80-mil white sheet in a standard vacuum forming machine after 2 to 3 min. at a heater temperature of 350° C. and at a distance of 3 to 4 inches.

Styrene-Acrylonitrile Polyblends

Sheets of styrene-acrylonitrile copolymer are less tough than high-impact styrene sheeting. By blending this copolymer in different ratios with butadiene-acrylonitrile copolymer, very tough sheetings of stiff to leather-like rigidity are obtainable. The stiffer types are easy to vacuum form, whereas the leather-like types require the combined vacuum-forming and draping technique.

After drawing, the total elongation of the stiffer type was determined as a measure of toughness. Figure 6 shows that the total elongation decreases with increasing forming temperature and is higher at a smaller draw than at a higher. The optimum forming temperature of this type may be considered to be 165 to 175° C. The drawn sheets when aged did not shrink upon exposure at 74° C. for 100 hours. At higher forming temperatures or at a longer exposure at 85° C. and above, discoloration and degradation of the rubber portion occurs.

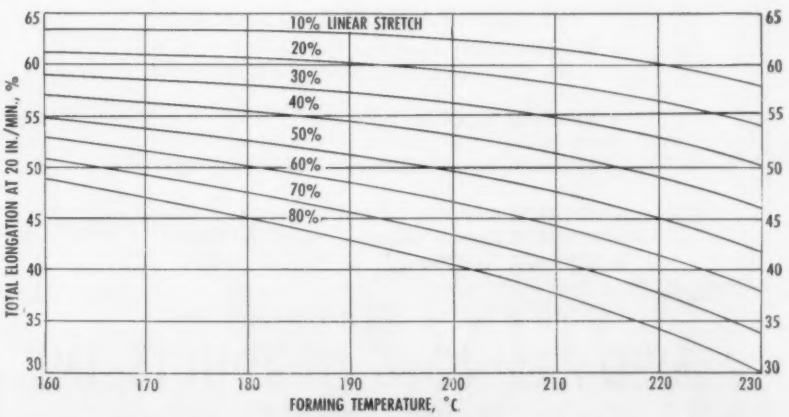

Fig. 6—Total elongation of styrene-acrylonitrile poly-blend sheets drawn in two directions at different temperatures and at different stretching ratios

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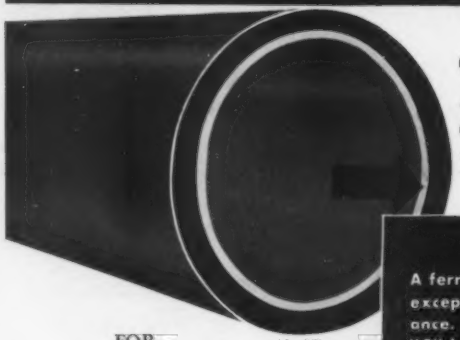

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Creep Properties

(*From pp.* 150-152)

on one side of the amorphous sample. Theory of crazing suggests that the greatest crazing should occur in the most crystalline material. Thus, crazing of one side of the amorphous sample may indicate crystallization on one surface.

Results of two creep tests of Geon 404 at 4000 p.s.i. are shown in Fig. 2, p. 152, with recovery following removal of load. One of these specimens was prepared from the sheet of material as received from the molder. The other specimen was prepared from the same sheet with the same orientation, after the sheet of material had been annealed to remove residual stresses. The material was annealed by placing it on a glass plate and heating in an electric oven at 275° F. for 15 min. and cooling slowly. Measurement of reference marks on the surface before and after the annealing indicated a shrinkage of 5.1 and 0.8% in the lengthwise and crosswise directions, respectively, of the original sheet (direction of calendering). Greater shrinkage at the center of the sheet than at the surface was indicated by the concave appearance of the edges of the sheet.

As shown in Fig. 2 the as-received sample showed more creep than the annealed sample, about 1.48 and 1.39% creep, respectively. Apparently the tensile residual stresses locked in the sample made the material more susceptible.

Creep tests at two different stresses are shown in Fig. 3, p. 152, for a grade-C canvas laminate. The tests shown at each stress were tested with an elapse of time of about 10 yr. between tests. When tested in August 1943 the laminate was about 1 mo. old. It was stored at a constant temperature of 77° F. and 50% relative humidity continuously since that time except during machining of specimens.

The results shown in Fig. 3 indicate that the creep resistance has improved with age. The creep at 500 hr. was reduced with age from 1.17 to 0.99% at 5700 p.s.i. and from 0.42 to 0.37% at 2850 p.s.i.

Conclusions

The creep of Kel-F is markedly influenced by crystallinity. The most

crystalline material was found to be the most resistant to creep influences.

Crazing of Kel-F results from creep. At the same stress, an amorphous sample showed some crazing, intermediate samples showed none, and crazing took place in one crystalline specimen.

Creep produced crazing in crystalline Kel-F in 19 hr. at 2210 p.s.i.; at 3600 p.s.i. considerable crazing was present.

When crazing occurred, the creep strains were much larger than without crazing.

Residual tensile stresses in Geon 404 result in greater creep.

Aging of grade-C canvas laminate produces a substantial reduction in creep.

Acknowledgment

This work was performed in the Department of Theoretical and Applied Mechanics as a part of the work of the Engineering Experiment Station of the University of Illinois, in cooperation with Picatinny Arsenal, Ordnance Corps, Department of the Army. The author wishes to acknowledge the assistance of R. G. Carlier, B. K. Ghandhi, H. S. Harper, R. G. Hering, G. Khosla, and D. M. Sen in performing the tests and preparing the data.

The gift of samples of Kel-F by The M. W. Kellogg Co. and the samples of canvas laminate by Synthane Corp. are gratefully acknowledged. The cooperation of B. F. Goodrich Chemical Co. and Nixon Nitration Works in preparing a special sample of Geon 404 is appreciated.

References

1. W. N. Findley, "Mechanical Tests of Cellulose Acetate. Part II. Creep," Proc. A.S.T.M. *42*, 914 (1942).

2. W. C. Ellis and J. D. Cummings, "Creep Test Method for Determining Cracking Sensitivity of Polyethylene Polymers," A.S.T.M. Bulletin No. 178, 47 (Dec. 1951).

3. W. N. Findley, "Plastics: Their Mechanical Behavior and Testing," Applied Mechanics Reviews *1953*, 49-53 (Feb.).

4. W. N. Findley and W. J. Worley, "Mechanical Properties of Five Laminated Plastics," Natl. Adv. Committee for Aeronautics, Tech. Note No. 1560 (Aug. 1948).—END

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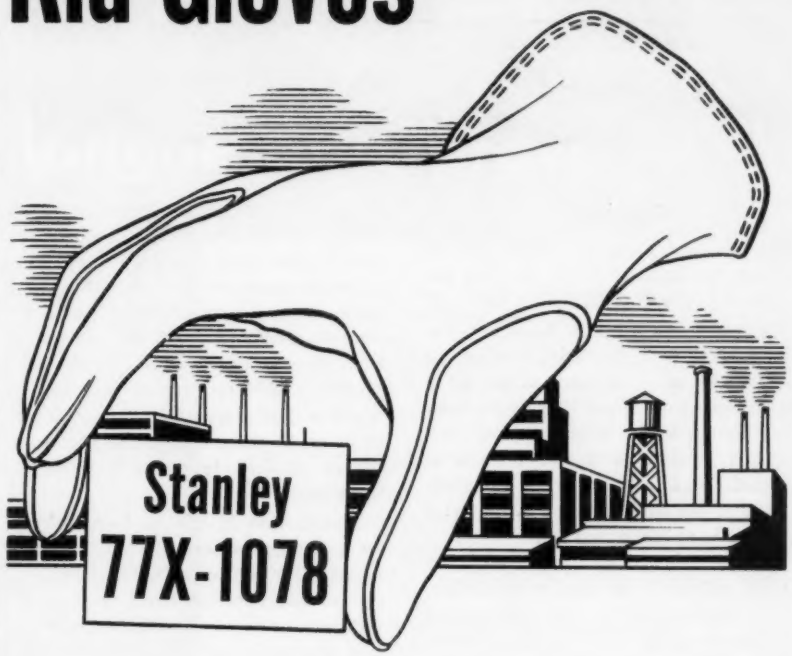

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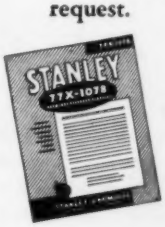
When materials handling means handling with care it will pay you to see that your racks, tote baskets, or other metal containers are coated with Stanley 77X-1078, the resilient orange plastisol that safeguards your product from damage. In cleaning and finishing operations the high resistance of 77X-1078, to inorganic acids, salts, and alkalis, to organic materials — particularly trichlorethylene and perchlorethylene — and to most plating solutions, is your assurance of surface protection that lasts. And the surface of 77X-1078 is just hard and slick enough to promote rapid drain-off and to minimize carry-over. The new Stanley bulletin shown below contains full details about application of 77X-1078 and the test results that proved its chemical resistance. Copies are available on request.



Write today for the new bulletin on 77X-1078 to the Stanley Chemical Company, 71 Berlin Street, East Berlin, Connecticut.

PLASTISOLS
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THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Caprolactam

CAPROLACTAM is a word that is not too familiar to the plastics industry in the United States, but it is going to become better known in the future. It is a material similar to nylon and used for many of the same purposes. In Europe it is much better known as the base material from which Perlon is made. Perlon is sometimes known as nylon 6 in contrast to the Du Pont type of material which is called nylon 6,6.

Both nylon 6 and nylon 6,6 are used primarily as textile materials, but plastics molders are quite aware of the progress that has been made by nylon as a molding and bristle material in the last few years.

No accurate figures are available, but estimators believe that somewhere around 20 million lb. of nylon will be used for plastics molding and bristle purposes in 1954. Included in the molding material is the formulation used for jacketing the polyethylene-coated wire that was employed in such great quantity for infantry assault wire during the Korean war. Nylon molding material had just begun to really move ahead shortly before the Korean invasion. It is doubtful that much more than 1 million lb. a year was used for plastics fabrication previous to 1950. Nylon bristle production has grown steadily but slowly since about 1947. Several million pounds are estimated to be used annually for tooth brushes, paint brushes, and various other brush applications.

There are claimed to be almost 100 molders in the eastern part of the United States alone who are working with or experimenting with nylon 6,6—or as Du Pont calls it, Zytel. Some market analysts say that there are almost as many captive plants—that is, companies which use nylon molded parts but do their own molding. In the custom molding field, there are probably only 15 or 20 companies that concentrate or specialize on nylon molding in quantities of more than 3 or 4 thousand lb. a month since most of the applications require more experience and skill in working with the material than is necessary with the usual plastics products; and they also demand a special merchandising job in order to fit them into those markets where quality is more important than price.

Speculation is rife as to whether or not caprolactam (nylon 6) can be used for the same molding applications as nylon 6,6. There are many different opinions as to the comparative properties of these two similar materials. Caprolactam, or nylon 6, is said to be softer than nylon 6,6. For example, it would make a good monofilament for fish lines but might not be so good for paint brush bristles since it doesn't have snap back. Caprolactam is very tough and has good abrasion resistance, even though it has a soft feel. The nylon 6,6 exponents say that there is some question as to the usefulness of caprolactam for molding hard items such as gears or bushings but that it may be used for softer items such as hammer heads of the mallet type. Surface hardness of extracted caprolactam is reported to be just as good as nylon 6,6, although the material is not as rigid.

Both materials absorb moisture with the resultant expansion and shrinkage problems in molding operations, but there are conflicting reports on whether or not one is less troublesome than the other. There is some possibility that caprolactam may be more suitable for large pieces, but nylon 6,6 advocates say their data do not support that contention.

Interest at the moment is high in these materials because various companies in the United States are now entering the field, where Du Pont was heretofore the sole supplier.

National Aniline, a Div. of Allied Chemical & Dye Corp., expects to bring in a caprolactam monomer and polymer plant in Chesterfield, Va., around the first of the year. They will also produce the plastic-type caprolactam, or nylon 6, and will sell it to molders and extruders through the Barrett Div. of Allied.

Hercules Powder Co. has been supplying molders with experimental quantities of caprolactam polymer from Europe for some time. Hercules has been providing its British customers with this material for several years and selling it there in competition with I.C.I.'s nylon 6,6.

Mathieson Chemical Corp., now a partner of Olin, announced almost two years ago that the company would build a $1.5 million plant to make caprolactam which would come into production late in 1954 in Morgantown, W. Va. The entire output has been contracted to American Enka, but the latter company will use it all for fabric. Enka has surveyed the possibilities in plastics but so far has shown no intention of entering the field with the Mathieson product; however, the firm is reported to be interested in merchandising Akulon plastic which is similar to nylon 6,6 and produced by the Akulon firm in Holland, of which American Enka is a subsidiary.

Chemstrand, a Monsanto-American Viscose combination, is now producing nylon 6,6 for fabric under a Du Pont license but has given no indication that it is expected to enter the plastics field.

Alfred C. Toepfer, an importing firm of 1 Broadway, New York, N.Y., is contacting molders with the reported intention of distributing Grilon which is a Swiss product similar to Perlon, or nylon 6.

Nova Chemical Corp., 147-153 Waverly Place, New York 14, N. Y., announced several months ago that it would sell commercial quantities of caprolactam monomer from Europe to American customers. The company was aiming particularly at the plastics market.

Du Pont has had caprolactam available for several years but hasn't said much about it. Apparently, Du Pont's interest is primarily in nylon 6,6, or Zytel.

Underneath the surface there is, of course, a great deal of interest in whether or not all this activity may result in a lower price than the present $1.60 a lb. for nylon 6,6 mold-

* Reg. U. S. Pat. Off.

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MONSANTO LUSTREX Styrene Plastic

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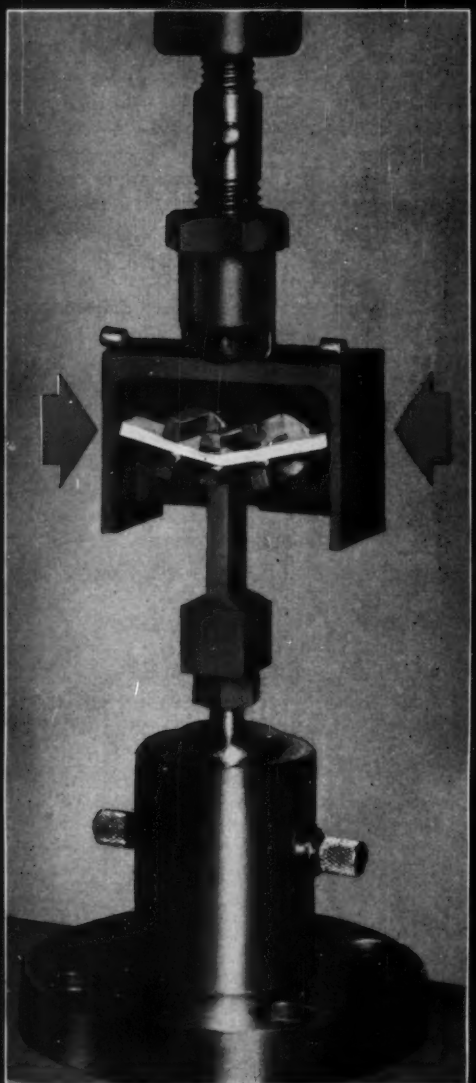

Rough treatment dramatizes strength of Lustrex! The Flex fatigue tester, one of many precision instruments used in Monsanto's laboratories, bends a sample of Lustrex Hi-Test 88 styrene plastic back and forth to test flexing strength.

Result: Lustrex Hi-Test 88 styrene plastic offers almost *15 times more resistance* to flexural fatigue than general purpose styrene!

Actual laboratory tests, shown in the photo, have dramatically proved that Monsanto's Hi-Test 88 styrene plastic offers almost *15 times more* resistance to flexural fatigue than general purpose styrene! In addition, your product will benefit from Lustrex Hi-Test 88 styrene plastic's other tested advantages:

Compared to general purpose styrenes:

- 5 times tougher than general purpose styrene!
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- Superior resistance to strain!
- High surface gloss with excellent color stability!

Compared to other high impact styrenes:

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For full information on how Lustrex Hi-Test 88 styrene plastic can help you improve the quality and sales appeal of your product, write to MONSANTO CHEMICAL COMPANY, Plastics Division, Room 2612, Springfield 2, Mass.

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You can bend a straight bar of Lustrex Hi-Test 88 styrene plastic like this into a pretzel shape — a dramatic demonstration of its greater flexibility and toughness!

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THE PLASTISCOPE

ing material. Some market researchers think that nylon at $1.00 a lb. or less would create a greatly increased demand for the material. But so far as can be ascertained from current information, there is no indication that such a price situation is likely to materialize within the foreseeable future despite the coming competition.

Polyethylene on the Farm

AMAZING new uses for polyethylene film which crop up almost every day continue to confound market researchers who try to predict the materials' future. One of the latest of these developments is described in a recent issue of the *Farm Journal* magazine in an article about a farmer who grows strawberries in California. This farmer lays polyethylene strips over the tops of the rows in his strawberry bed and then cuts the film with a knife before setting out the plants. As a result, the berries ripen high and dry with little or no rot from rain or irrigation. There are fewer throw-aways when berry picking time comes. The soil cover saves water otherwise lost by evaporation. Another advantage is offered by the film in that birds cast a suspicious eye at the glistening plastic and stay away.

The farmer states that he has had some of the plastic strips on the ground for three or four years now and expects that he will have no trouble making it last another season. He learned how to use the material after experimenting with polyethylene film as a ground cover for fumigation.

Vinyl Pipe Producer

PRODUCTION of rigid vinyl pipe on a larger scale than heretofore possible has been given added emphasis this month by the announcement that Easton Plastic Products Co., Inc., had started production in a big, new plant located at 900 Line St., Easton, Pa. The installation includes four twin-screw extruders and one single-screw machine with space for setting up 37 more machines in the new building.

Easton is now extruding high- and medium-impact Goodrich rigid vinyl pipe in diameters from ¼ to 2 in. and expects to have 3- and 4-in. diameter pipe in the near future. The manufacture of 6-in. pipe is also being contemplated.

Part of the company's pipe production is now entering the electrical conduit field, although it is expected that the greatest portion will be used in the chemical, utility, and petroleum fields. Easton, incidentally, is affiliated with a Holland concern that is now selling over 6000 lb. per week of rigid P.V.C. for electrical conduits.

Vinyl conduit offers two advantages that facilitate the job of the workers installing the electrical system. First, it is simple to bend by hand, requiring only brief treatment with a hot-air gun; second, the surface is so smooth that wires are pushed or drawn through it with a minimum of effort.

Prices for normal-impact pipe range from 15¢ a ft. for ¼-in. dia. to $1.52 for 2-in. diameter. Prices vary depending upon the thickness of the wall. In high-impact pipe, the price ranges from 15¢ to $1.38 a foot.

Dr. Gerhard Wagner, who is president of the new organization, is also president of Sipanam, Inc., New York City, importers and exporters of steel pipe. Plant superintendent is Harvey G. Wismer, formerly of Celanese Corp. of America, and sales manager is E. Stanley Schofield, formerly with Wilmington Plastics Products.

Dow Expands Facilities

CONSTRUCTION of new facilities for the production of Styrofoam is under way at the Allyn's Point (Conn.) Div. of The Dow Chemical Co. The new plant represents an expansion move designed to supplement production facilities at Dow's headquarters in Midland, Mich.

Styrofoam, produced commercially since 1943, possesses a combination of properties that make the material adaptable to usage as a low-temperature insulation material for cold storage warehouses, tanks, pipes, homes and commercial buildings, and refrigerated truck and railroad cars; as a basic material for floral displays and novelty uses; and as a buoyancy material for boats, rafts, and docks.

The new facilities will be under the operating supervision of Dr. William H. Schuette, manager of plastics production in Midland, and Kenneth E. Stober, manager of the Allyn's Point Division.

Dow also announces the expansion of facilities for latex research and development at Midland. The program, to be headed by J. W. Britton, a company production manager, will concentrate on the improvement of present Dow latices and the development of new latices for applications in the paint and paper coatings fields, as well as other industrial uses. The new latex research laboratory is scheduled for occupancy in November.

Entry into the field as a producer of polyvinyl chloride dry blend—intended primarily for the extrusion industry—has also been reported by Dow. Dry blends are chiefly for use by processors who do not have Banbury mixers or other extensive mixing equipment. Dry blend uses include wire covering, garden hose, tubings, and gaskets. Along with the new dry blend, Dow has also developed improved formulations of polyvinyl chloride resin for calendering and extrusions operations. The company states that the resin's excellent heat stability and low gel counts make it ideal for high-speed film and sheeting production.

Chemical Show in Germany

INVITATIONS to the ACHEMA XI —Chemical Apparatus and Equipment Congress and Exhibition—to be held in Frankfurt am Main, Germany, from May 14 to 22, 1955, are now being issued. A pamphlet of eight pages is available, previewing the various events in connection with chemical engineering and the chemical apparatus and equipment fields that the DECHEMA, Deutsche Gesellschaft für Chemisches Apparatewesen, is arranging.

Over 600 firms from 12 countries are scheduled to have exhibits. Many thousands of units of machinery, apparatus, equipment, and complete plant set-ups, representative of all branches of chemical engineering, regulating and control equipment, constructional materials, and labora-

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A QUICK PRESS of the button and the ingenious "Jet Brush" dishwasher shoots a jet of liquid detergent from the reservoir inside its hollow handle. Conveniently combining a scraper and a handy brush, it makes dishwashing and other household chores easier and faster.

When I. J. Moritt Products Co., Inc., Chrysler Bldg., N. Y., first brought the project to Ideal, it was far too complex for economical production. Ideal's engineers pitched in to iron out design problems and to guarantee the efficient operation of the complicated mechanism. They specified high impact styrene as the basic material. Now Ideal injection molds the components, assembles them with the brush units, inspects . . . packages . . . ships.

Companies who will settle for nothing but the highest grade workmanship and service turn to Ideal for their custom injection molding requirements. Full information about what we can do for you will be supplied by A. C. Manovill, Vice President in Charge of Sales, Ideal Plastics Corporation, 184-10 Jamaica Ave., Hollis 7, N. Y. Phone: AXtel 7-7000.

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tory equipment for all the varied fields of chemical research will be on exhibit in 11 exhibition halls, comprising approximately 46,000 sq. yd. of floor space.

The 1955 Congress of the European Federation for Chemical Engineering will be held in conjunction with the ACHEMA XI Congress and with the active cooperation of the 19 technical and scientific societies, representing 11 countries, which form the European Federation for Chemical Engineering. At the same time, special meetings of the "Gesellschaft Deutscher Chemiker" and other technical scientific societies, as well as the annual general meeting of the DECHEMA, will also be held.

The ACHEMA XI pamphlet mentioned above is issued in English, French, German, Italian, and Spanish. A copy of the pamphlet may be obtained gratis upon application to the DECHEMA, Deutsche Gesellschaft für Chemisches Apparatewesen, Frankfurt am Main, W13, Postfach.

Coated Yarns

VINYL-COATED, heat-set, fibrous glass yarn produced by Chemo-Textiles, Inc., West Warwick, R. I., has proved excellent for insect screening and has already been accepted by the trade. This same yarn in different counts is being evaluated for seat covers, outdoor furniture, golf bags, luggage, awnings, etc.

The company coats all natural and synthetic yarns, particularly fibrous glass, in single and plied yarns, in count sizes from 75 to 900. Coatings include, among others, vinyls, silicone, Teflon, nylon, latex, and silicone rubber.

Sealing Tape for Fibrous Glass

MORE efficient and economical molding of polyester-fibrous glass laminates is claimed to be possible with a versatile sealing tape developed by Presstite Engineering Co., 3798 Chouteau Ave., St. Louis 10, Mo.

The tape, known as No. 579.6 Polyvinyl Film Sealer, is designed as a replacement for metal forms, gaskets, rings, and C clamps in hermetically sealing the polyvinyl alcohol blanket or bag used in vacuum bag molding of polyester-fibrous glass laminates.

The light green, odorless sealer is reported to be permanently soft, will not flow at 300° F., and is non-staining, non-bleeding, and non-toxic.

Samples and additional information may be obtained from the company.

Montecatini Report

THE breadth and scope of some European manufacturing organizations are at times difficult to comprehend in the United States, even though we are familiar with giant industrial organizations. It is true that American firms sometimes produce a great variety of unrelated products but seldom as many as the number produced by those giant European enterprises.

Such a company is Montecatini of Italy whose annual report has just crossed our desk. It is truly an amazing book to anyone unfamiliar with European enterprise. The company produces a great variety of items including electric power, coke, jute products, natural gas, aluminum, titanium, marble and many other mined or quarried materials, and as complete a line of chemicals, fertilizers, pigments, and plastics as any of the larger corporations in the United States.

With regard to plastics production, the brochure states that they are now producing special polystyrenes with high resiliency, high softening points, and antistatic properties that compare favorably with polystyrene produced in other countries. Fertene, Montecatini's polyethylene, will soon reach a production figure of 8 million lb. annually, with equipment being installed for the production of an additional 4 million pounds. Their new oxo-synthesis installations will permit production of plasticizers on a greater scale and at less cost than had previously been possible. The company asserts that its solid and liquid urea adhesives are increasing in sales volume as are all other urea and phenolic resins with particular emphasis being placed upon the new formulations for foundry cores. Good progress has been made in research to improve the manufacturing cycle for melamine.

Montecatini has completed patent arrangements with American Cyanamid Co. to produce some 10 types of polyester resins. Its ion exchange resins are being suggested in the treatment of water, sugar, fruit juices, and glycerin. The firm's production of polyvinyl chloride has exceeded the maximum goal originally set. Cellulose acetate for molded plastics and film is another of the company's various products. Emulsion-type paints for both indoor and outdoor use are being developed. Several synthetic fibers including acetate, nylon, polyester, and the chemicals from which they are produced come from Montecatini plants.

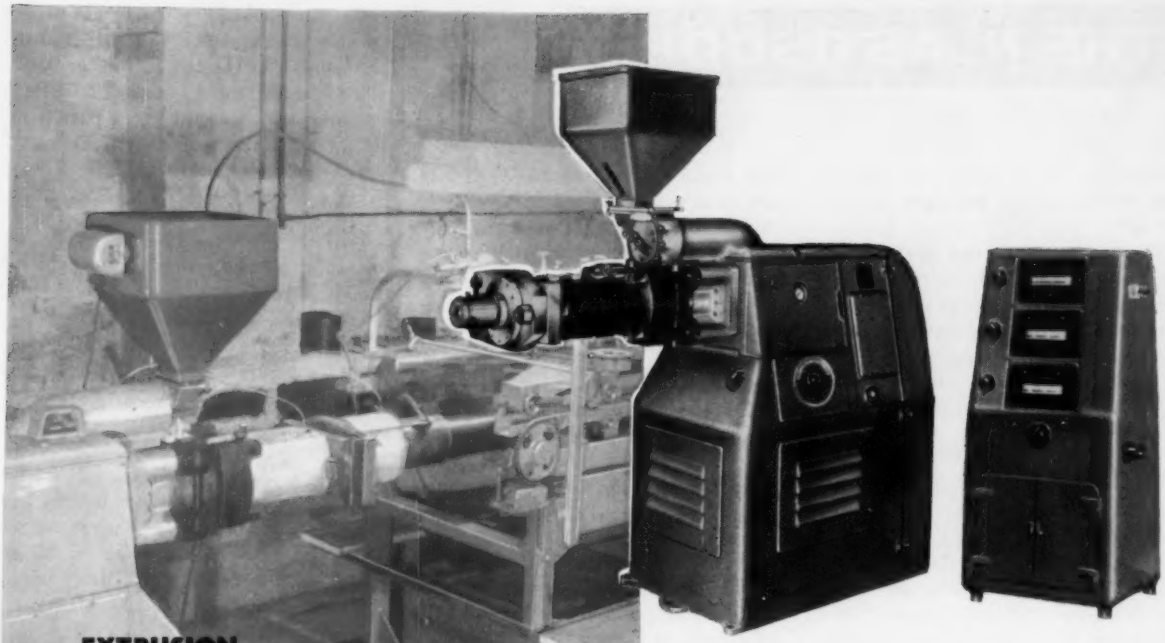
The company's research projects include the utilization of methane for production of hydrocyanic acid; synthesis of acrylonitrile; acrylic esters; organic polyelectrolytes for soil conditioning; and a process for recovery of tail gases in the urea plant.

Americans will be interested in a comment on business conditions made in the Montecatini booklet which seems to be a common observation the world over. The management says: "If everybody were aware of the efforts made daily by our chemical producers to keep their plant running properly, in spite of continually increasing burdens and selling prices conversely in constant decline, the world would certainly be astonished by the high level of productivity which it has been necessary to attain in order to react against the indiscriminate pressure of the importations."

Copies of the Montecatini booklet may be obtained from its American representative, Chemore Corp., 21 West St., New York 6, N. Y.

Mold Release

AVAILABILITY of Bomb-Lube Concentrate in 1- and 2-lb. cans has been announced by Price-Driscoll Corp., 520 Fifth Ave., New York 36, N. Y. The company claims that its mold release product is one of the oldest on the market, but that the new type package gives the user a new tool to which limitations and inconvenience of older methods do not apply. It is reported that Bomb-Lube Concentrate will give up to 35



EXTRUSION

The R.C.100 twin-screw machine is a medium capacity extruder with a nominal output of 100 lb. per hour and will operate continuously over long periods, producing tubes, rods and sections in thermoplastic materials. Coated cables, rods and tubes are standard jobs.

INJECTION

The dependable S.H.8/10 injection moulding machine will produce up to 10-12 oz. per shot. Large mould plates and a 300 ton lock ensure a wide productivity range.

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cycles per application, depending upon mold contour and type of material.

The product has been successfully used for several years as a mold parting agent for injection and compression molding, die casting, epoxy potting, acrylic casting, C process, rubber molding, lost wax casting, and reinforced fibrous glass molding.

Electroformed Molds

FORMATION of an associate company, Electromold Corp., 140 Enterprise Ave., Trenton 9, N. J., has been announced by Stokes-Trenton, Inc., Trenton 9, N. J. The new firm will produce cavities and other plastic mold parts formed of a hard (45-50 R.C.) nickel cobalt alloy by a recently developed electroforming process.

The company claims that the new electroforming technique is an important advance in the making of molds. Economies are possible in many types of molds which are expensive to produce by more conventional methods. Since the cavities are formed hard and are not subjected to heat treatment, greater accuracy can be achieved in the molding of irregular shapes such as cavities for plastic gears. It is further claimed that many molds which are impractical to make by machining, or are too costly, now become practical. Electroformed molds can bring new textured surfaces to the field of molded plastics and the new process, reportedly, will greatly extend the use of plastics in the field of novelty buttons and jewelry parts.

Plastics Seminar

FOR the past several months the American Society of Mechanical Engineers has been holding weekly meetings to acquaint mechanical engineers with the properties, characteristics, and uses of plastics. The New York and New Jersey Chapters of the Society of Plastics Engineers have been working in cooperation with A.S.M.E. to present the various subjects. On November 15 there will be a final meeting that will consist of a round-table discussion with all previous speakers present. In addition, there will be an exhibit of plastics products produced by members of S.P.E. The regular monthly November meeting of the joint New York and Newark Chapters of S.P.E. will be held in conjunction with this final A.S.M.E. meeting at Central Commercial High School, 214 E. 42nd St., New York 17, N. Y.

Those desiring to exhibit their products or to attend the meeting should get in touch with Bill Lewi, Dusal Tool & Mold Co., 37-01 Vernon Blvd., Long Island City, N. Y.

Epoxidized Plasticizers

THE use of epoxidized soy bean oil for secondary plasticizing and stabilization, and epoxidized esters of fatty acids with monohydric alcohols as plasticizers and stabilizers seems to be growing steadily as vinyl processors continue to acquire more knowledge by experience in handling them.

To encourage research on epoxidation in the plasticizer field, General Mills, Inc., Minneapolis, Minn., announces that it will license U. S. patents 2,458,454 (1949), "Process of Preparing Epoxy Derivatives from Unsaturated Aliphatic Compounds," and 2,559,177 (1951), "Plasticized Polyvinyl Resin Compositions," containing the inventions of D. E. Terry and D. H. Wheeler assigned to General Mills in this field.

Present producers of epoxy plasticizers include Rohm & Haas Co., Pittsburgh Coke & Chemical, Archer-Daniels-Midland Co., Rubber Corp. of America, Ohio-Apex, and Argus Chemical Laboratory. In addition, The Baker Castor Oil Co. has continued one step past the epoxidation to produce di-hydroxy and acetoxy compounds.

Increased volume in the use of these materials as plasticizers and stabilizers has been attained because a large number of vinyl products now contain 2 or 3% of the epoxy plasticizer in order to give heat and light stability to the product. Also, the epoxidized fatty acid esters (cyclohexyl epoxy stearate is an example) impart excellent low-temperature flexibility to vinyl film and sheeting. Because of this property, the epoxies have found considerable co-utilization with tri-cresyl-phosphate in the fabric and drapery field, according to General Mills' technicians who also assert that it is possible to use some types of fatty epoxy compounds as primary plasticizers.

Boonton Stock Sales

SOLE stockholders of Boonton Molding Co., Boonton, N. J.—George K. and Myra P. Scribner—have disposed of their stock in the company to John W. Mecom of Houston, Texas.

The business will be carried on just as in the past, except that instead of a corporation it will be a limited partnership composed of John W. Mecom as the limited partner and Edward R. Mabel of New York as general partner. Mr. Scribner will continue in complete charge as general manager under a long term contract. No changes in personnel or policies are contemplated.

Flexible Lining Material

EASY-TO-INSTALL, a flexible new lining material with excellent chemical, physical, and electrical characteristics, has been announced by Kaykor Industries, Inc., 4459 Broad St., Yardville, N. J.

Designated as Vyflex L-10, the new thermoplastic lining, based on polyvinyl chloride resins, is claimed to be suitable for numerous industrial lining needs. It protects such varied equipment as tanks, fume ducts, tank cars and trucks, and the highly complex equipment used for mixing, storing, washing, and transporting of corrosives.

Because Vyflex L-10 is inherently elastic, thermal expansion and contraction will not crack it, and the damaging effects of mechanical abuse are minimized. Good insulation qualities minimize current loss in electrolytic reactions. The inherently smooth, highly polished surface of Vyflex L-10 simplifies cleaning, speed solution flow, and provides superior abrasion resistance.

Low-Cost Glass Laminate

FIBROUS glass-polyester resin laminate in the price range of N.E.M.A. XX laminates is now available as Grade TS Glastic from The Glastic Corp., 1823 E. 40th St., Cleveland 3, Ohio. The company claims that the material offers 20% higher heat stability, three times better

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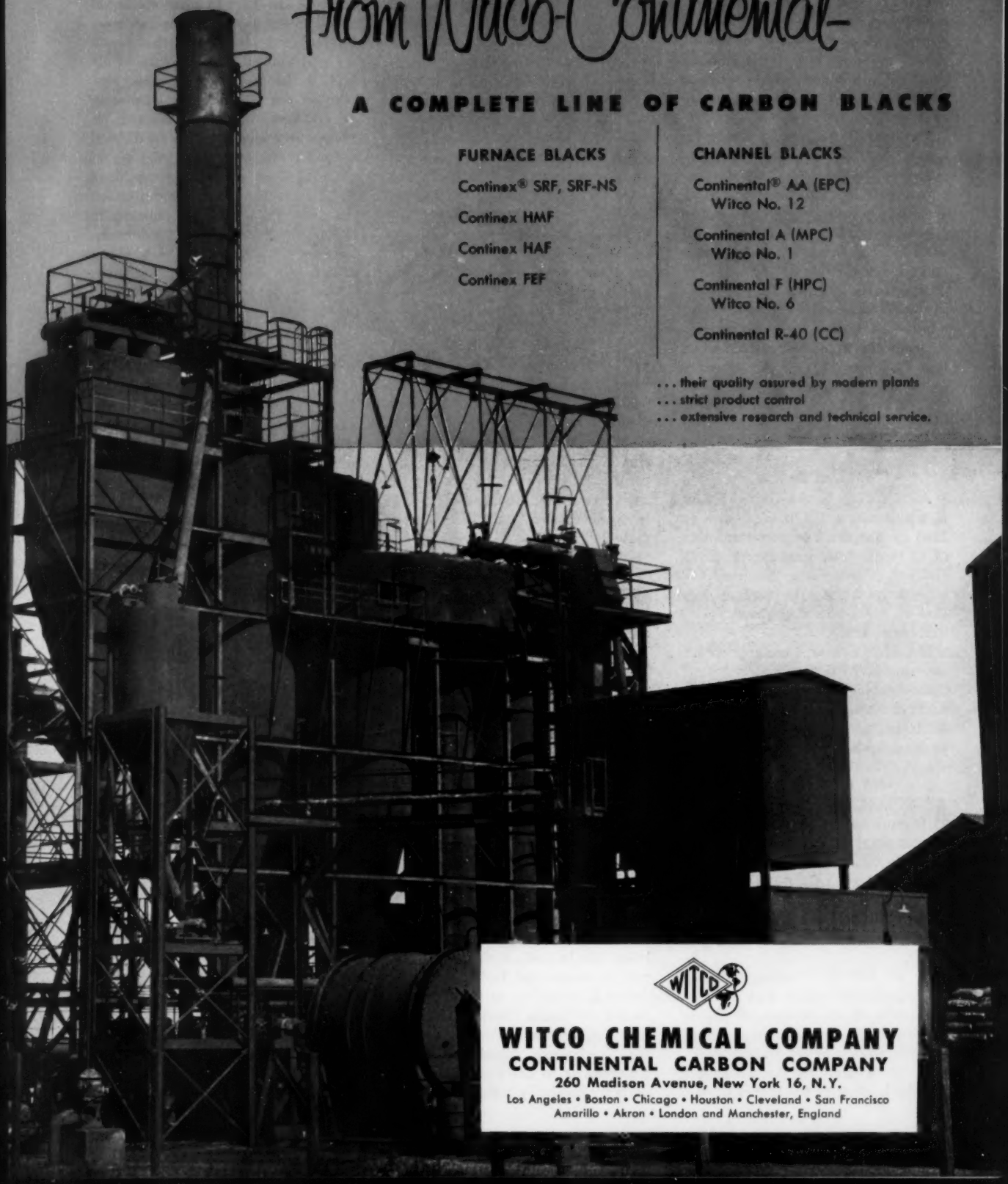

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impact strength, 25 times better arc resistance, and 40% lower moisture absorption than XX laminates. The laminate is also claimed to permit punching holes close to the edge or shearing of narrow strips without preheating in thicknesses as heavy as ½ inch.

The manufacturer reports that TS Glastic has been successfully field-tested at higher than Class B temperatures. The material is said to be an ideal medium for use in mounting panels, terminal strips, barriers, coil washers, bus supports, base plates, and other insulating or physical supporting parts in switch gears, transformers, motors, controls, and appliances.

Grade TS is available from stock in thickness from 1/16 through ½ in. in sheets sizes of 24 by 36 in. and 36 by 72 in.; it is also available in thicknesses up to 1½ in. upon request.

S.P.E. at Buffalo

EACH family in the United States will consume 150 lb. of plastics by 1960 as compared to a consumption of 83 lb. in 1954, according to E. V. Hellyar of Monsanto Chemical Co. who spoke before the Buffalo Section of the Society of Plastics Engineers recently.

Mr. Hellyar's talk accompanied a showing of the film "Kitcheneering." This movie illustrates what the average housewife can buy with $15.00 in the way of plastics products to dress up her kitchen.

Cast Vinyl Film Prices

ANNOUNCEMENT of a reduction from 2 to 10¢ a lb. in the price of cast vinyl film has been made by Bakelite Co., a Div. of Union Carbide and Carbon Corp., 260 Madison Ave., New York 16, N. Y. The new prices will be from 94¢ to $1.20 a lb., depending upon the quantity and grade.

C. W. Blount, vice president in charge of sales, states that the cast vinyl film offers exceptional clarity and toughness compared to standard calendered film of equivalent thickness. It is used in the packaging field by lamination to other materials such as aluminum foil, paper, cloth, and other transparent films to produce an effective moisture-vapor barrier. Applications of these laminations also include military packaging of machinery items as well as commercial packaging of drug and pharmaceutical products, hygroscopic chemicals, photographic film, surgical supplies, and materials that must be sterilized before packaging.

Other uses of cast vinyl film are protective covers for garments and displays, transparent safety umbrellas, oxygen tents, waterproof bandages, packaging of cheese and other food and dairy products, and storm window glazing.

Nylon Blocks in Stock

NYLON in stock rectangular blocks and disks for machining into parts, in cases where the quantity doesn't warrant the building of a mold, are now available from A. L. Hyde Co., Grenloch, N. J. The company can supply blocks up to 8 in. square and 4 in. thick and disks 11½ in. in dia. and 4 in. thick for immediate delivery.

Plastics Pioneers Officers

NEW officers of the Plastics Pioneers Association have been appointed as follows:

President: Clinton Blount, Bakelite Co.

Vice president: James Neal, Norton Laboratories.

Secretary and treasurer: Hans Wanders, Northern Industrial Chemical Co.

The Board of Governors members are Harry A. Rankow, Watertown Mfg. Co.; Chris Groos, Boonton Molding Co.; and S. I. Howell, Mack Molding Co.

Plastics in India

FIFTY percent of the installed capacity for plastics processing is lying idle in India owing to a business recession and lack of sufficient demand, according to speakers at a recent All India Plastics Manufacturers' Conference. For that reason, the Conference asked the Indian government to place a ban on imports for finished plastics items. They also asked that the lowest possible rate of sales tax be placed on industrial plastics items in their own country.

Among other items of interest discussed at the meeting was the fact that phenolic molding material, vinyl chloride sheets, and phenolic laminated sheets were the only raw materials being produced in that country and that all other raw materials had to be imported. It was also pointed out that the total capacity of injection molding equipment in the country was about 700 oz. divided between 300 machines, varying in capacity from small hand machines to 12-oz. machines. In compression equipment, the installed capacity is 12,000 tons divided into 200 machines, varying from 1 to 1000 tons. There are also about 50 extruding machines in India, varying in capacity from 1 to 4½ inches.

The production of plastics products had declined from 14,500,000 gross pieces in 1951 to about 12,700,000 in 1953. On the other hand, production of phenolic molding powder had grown from 460,000 lb. in 1951 to 836,000 lb. in 1953. Phenolic laminated sheets had grown from 40 tons in 1952 to 80 tons in 1953.

Thermosetting Adhesives

A NEW series of thermosetting adhesives that have two to seven days stable working periods, coupled with fast-curing hot or cold press, has been developed by National Adhesives, 270 Madison Ave., New York 16, N. Y. The products, known as Duro-Lok, are the company's initial entry into this field and represent many years of research and development.

Available in emulsion or solution form, as well as paste form, the adhesives are claimed to eliminate catalyst addition and proportioning, previously the most critical step in the preparation of thermosetting adhesives.

Excellent bonds have been developed between metal and metal,wood and rubber, plastics, and fire brick to other similar and dissimilar surfaces.

New Plant in Texas

PRODUCTION of plastics products in a new plant in Dallas, Texas, has been started by Hanszen Plastics Co. The new firm will engage in custom molding, manufacture of fibrous glass reinforced plastics lam-

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inates, and will also handle special orders. Products will be marketed under the tradename of H-P.

Custom molding operations will include door gaskets, corrugated closure strips, and sporting goods of flexible vinyl, as well as sporting equipment and aircraft parts of fibrous glass reinforced plastics.

Mr. Hanszen, president of Hanszen Plastics, was formerly supervisor of Carbon and Carbide Chemical Co.'s Texas City plant. He has 12 years' experience in the plastics industry.

Vacuum Forming Finish

NOW available from Logo, Inc., 13799 South Avenue O, Chicago, Ill., is a new finish, Logoquant R-102, used particularly in the form of a spray applied to high-impact polystyrene prior to vacuum forming.

The company states that Logoquant R-102 may also be used on acrylic, butyrate, and rigid vinyl sheet before vacuum forming. It is available in an unlimited range of pigmented colors.

The new finish completes a series of Logoquant materials developed for each vacuum formed plastics sheet, whether requirements demand spray or silk screening application.

Reed-Prentice Sale

PURCHASE of Reed-Prentice Corp., Worcester, Mass., has been arranged by Package Machinery Co., East Longmeadow, Mass., according to an announcement by Roe S. Clark, president of Package Machinery and Frederick W. McIntyre, Jr., president of Reed-Prentice. Both executives have announced to their respective stockholders that negotiations have been completed whereby Package Machinery Co., subject to the fulfillment of certain conditions, is offering to purchase the common stock of Reed-Prentice from its stockholders at a price of $12 per share.

Package Machinery is a leading manufacturer of packaging machinery, currently doing an annual volume of business in excess of $15 million.

During the past five years, four other companies have been purchased by Package Machinery—Frank D. Palmer Co., Chicago, Ill.; Rite-Way Products Co., Chicago, Ill.; National Bread Wrapping Machine Co., East Longmeadow; and Transparent-Wrap Machine Corp., Hasbrouck Heights, N. J.

Reed-Prentice is an outgrowth of several mergers, originating in 1877. The company manufactures injection molding machines, die casting machines, engine lathes, milling machines, and power driven chain saws. The company claims to be the world's largest producer of plastics injection molding machines, having been a pioneer in this field since 1935. Current annual sales of Reed-Prentice is approximately $6 million.

It is contemplated that operations of the two companies will be continued separately at their present locations.

Vinyl for Wire

TO MEET increasing demands for extruded wire insulation materials, The Goodyear Tire & Rubber Co., Inc., Akron 16, Ohio, is introducing a new electrical grade vinyl resin designated as Pliovic EDB90V. It is a pure polyvinyl chloride resin, first in a series of electrical grade resins soon to be released by the company.

The new resin is fully interchangeable with all other approved electrical grade vinyl resins where such interchange is permitted and has passed the required tests of the Underwriters' Laboratories.

Goodyear states that an outstanding characteristic of the new resin is its ability to dry blend readily into a smooth, free-flowing mix, thus lending itself well to extrusion and calendering operations.

Company Enters Molding Field

IN A MOVE to expand its activities in the plastics fabricating industry, Ocean City Mfg. Co., A and Somerset Sts., Philadelphia, Pa., has created a Contract Plastics Div. to handle fabrication and distribution of molded phenolic, molded reinforced plastic, and extruded fibrous glass rod stock.

Ocean City, manufacturer of fishing reels, has for several years also been the producer of a reinforced plastics tackle box, various molded phenolic fishing reel components, and fibrous glass fishing rod stock.

Fabricating Insulators, Inc., E. Rutherford, N. J., and its associate company, Fabricating Insulators of New England, Inc., have been named exclusive distributors of the new division's fibrous glass rod stock—both raw and fabricated—for chemical, mechanical, and dielectric applications in the East.

Shrinkable Polyethylene

AT A recent demonstration at the plant of Central States Paper & Bag Co., St. Louis, Mo., a polyethylene container claimed to be a new packaging development was shown. The new containers are called Poly-Skin bags.

Before a group of meat and poultry packers from Chicago and St. Louis, the company's packaging engineers went through the various steps in packaging turkeys, cut-up chicken parts, meat loaves, cold cuts, frankfurters, and other products. Poly-Skin is made of a Visking material which shrinks 30% in both directions to make a snug, protective, contoured fit.

After exhausting the air from the Poly-Skin bag with conventional equipment, the bag is twisted and the top clamped shut. The bag is then dipped for 3 sec. in a 215° F. solution containing propylene glycol, which raises the temperature of the water sufficiently to get full, rapid shrinkage. After dipping, the package of poultry or meat is iced or frozen as usual.

Package Competition

THE annual competition for the best package designs of the year will be conducted by Package Designers Council, a non-profit organization made up of the country's leading package and industrial designers. The exhibit will start early in February 1955 and the awards will be presented on February 9 at a luncheon at the Plaza Hotel, New York, N. Y. In addition, the council will present the Irwin D. Wolf Award for the best American package or packaging program.

All entrants must submit an actual three-dimensional package, with or without contents currently in mass production. Only packages that have been put on the market since October 1953 will be accepted. Entries for

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all American-designed packages must be in the hands of the committee by November 22. They should be mailed to Package Designers Council, 66 W. 38th St., New York, N. Y.

Wire and Cable Symposium

THE third annual Wire and Cable Symposium, jointly sponsored by the Signal Corps Engineering Laboratories, Fort Monmouth, N. J., and the Wire and Cable Industry, will be held December 7 through December 9, 1954, at the Berkeley Carteret Hotel, Asbury Park, N. J.

A program is being arranged to cover wire and cable materials, their characteristics and uses; wire and cable constructions, together with manufacturing and equipment problems; field construction methods; and uses in systems operation.

All companies and agencies represented at previous symposia will be contacted. Others interested in attending may obtain further details by contacting H. L. Kitts, Coles Signal Laboratory, Fort Monmouth, N. J. Telephone: Eatontown 3-1000, extension 81188.

College Degree in Plastics

A FORWARD-LOOKING move on the part of educators is the institution of a four-year course in plastics engineering at Lowell Technological Institute, Lowell, Mass. It is believed that this is the first full four-year course in plastics that has been offered.

The plastics course will be offered under the direction of Dr. Russell W. Ehlers, who is well known to a large portion of the members of the plastics industry because of his connection since 1947 with the United States Army Quartermaster Corps where several outstanding plastics products were developed under his supervision. He was particularly active in the development of body armor used in Korea. His work also included development of prototypes for such things as helmets, arctic sleds, snowshoes, and a wide variety of other plastics articles.

Dr. Ehlers was born in Middletown, Conn., and was educated at Wesleyan and Yale Universities. At the latter school, he held a Du Pont research scholarship.

Other affiliations of Dr. Ehlers were with Russell Mfg. Co., Middletown, Conn.; Sayles Finishing Co., Saylesville, R. I.; and 12 years with A. C. Spark Plug Div. of General Motors as chief organic chemist, where much of his work included research in plastics.

Present plans call for the development at Lowell of one of the most modern plastics fabricating laboratories in the country.

Light Color Plasticizers

PRODUCTION of plasticizers with lighter colors than has heretofore been believed possible has been announced by Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

As a result of this development, maximum color specifications on two plasticizers have already been reduced by one half, and Barrett expects that other plasticizers in its line will soon follow suit. Barrett's Elastex 28-P plasticizer (D.O.P.) specifications indicate a reduction from 50 to 25 Hazen, maximum. Elastex 80-P (dicapryl phthalate) has been reduced from 100 to 50 Hazen, maximum.

Barrett also announces the commercial production of a new low-cost plasticizer, called Elastex 40-P. It is priced at 27¢ a lb. in bulk quantities, with normal drum mark-up.

Electrosols

ELIMINATION of electrostatic charges is a matter of considerable concern to plastics processors, and for that reason attention is called to a bulletin recently published by Alframine Corp. of Los Angeles, Calif., and New York, N. Y., concerning the electrosols which that company produces particularly for this purpose.

Subjects included in the bulletin are a new material that is claimed to destaticize cellulose resins and polyethylene; instructions for milling polyvinyls at room temperatures or slightly higher with electrosols; use of electrosols to prevent the development of electrostatic sparks during operation and to temporarily eliminate development of static during various manufacturing processes; and the destaticization of upholstery, floor coverings, etc.

Teflon Filter Cloth

WOVEN Teflon filter cloth, tradenamed CPS (controlled pore size), is now available from Porous Plastic Filter Co., Glen Cove, N. Y. The company states that for the first time the corrosion and high-temperature resistance of Teflon has been engineered into a fabric with controlled pore size for filtration.

CPS is woven of Du Pont's Teflon fiber which has a tensile strength 20 times that of solid Teflon. The strength and flexibility of this new material put it in the same class as nylon and Dacron, according to company officials.

The new material is available in two grades, the finer for the removal of particles 25 microns and over, and the coarser for the removal of particles 40 microns and over. CPS has a lower service temperature limit of —100° F. and an upper temperature limit of 400 to 525° F., depending upon service conditions. It is ideally suited for applications where other filter cloths have shown inadequate life or where filtration equipment has in the past required cooling or dilution to accommodate the filter media.

Dr. Reppe to Lecture Here

A PIONEER in the development of acetylene processing methods, Dr. Walter J. Reppe of Germany arrived in the United States at the end of September enroute to Pittsburgh, Pa., to serve as Koppers Visiting Professor of Technology under a grant from Koppers Co., Inc.

Dr. Reppe, former vice president and director of I. G. Farbenindustrie A. G. and now research director of Badische Anilin und Soda Fabrik, is noted for his development of various methods of processing acetylene under pressure—today known as "Reppe Chemistry."

After his first three lectures at Carnegie Tech, Dr. Reppe started a tour organized by the school, which will cover the continent from Washington, D. C., to San Francisco, Calif., and from Houston, Texas, to Montreal, Que. At the conclusion of

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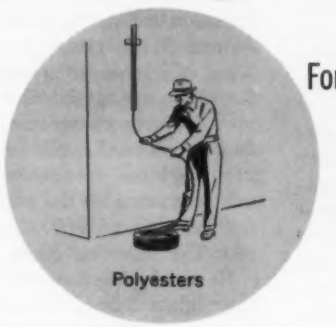

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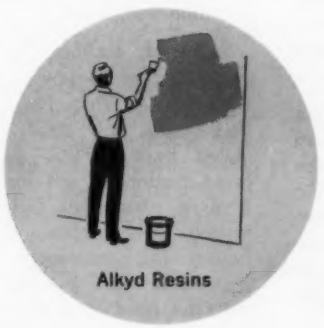

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the tour, Dr. Reppe will return to Pittsburgh for concluding lectures at Carnegie Tech on November 4 and 8. The chemist's final lecture will be given to Research Conference #13 at Carnegie Tech on Nov. 9.

EXPANSION

The Borden Co.'s Chemical Div. announces the opening of a new formaldehyde distribution center in Kernersville, N. C., to meet the increasing needs for the material in the South Atlantic states. The new center supplements Borden's two other formaldehyde shipping points in the East located in Bainbridge, N. Y., and Demopolis, Ala.

The Kernersville center permits Borden, for the first time, to offer tank-truck deliveries of formaldehyde along the entire Eastern seaboard, except for the northern tip of Maine and the southern tip of Florida. The company claims to be the only formaldehyde producer to offer such service for the entire area. Formerly, purchasers of formaldehyde could obtain the chemical only in drum or tank-car lots.

Carbide & Carbon Chemical Co., a Div. of Union Carbide and Carbon Corp., is nearing completion of a new unit to produce more than 60 million lb. of chemicals per year by the Oxo process at its Texas City, Texas, plant. The unit will be one of the largest employing the Oxo process for the synthesis of chemicals.

Using the extremely high-pressure reactions of the Oxo process, a large family of new alcohols, aldehydes, and acids will immediately be added to the more than 400 synthetic organic chemicals now produced on a commercial scale by Carbide & Carbon. Initial operation of the unit, which is scheduled to start in the fall, is planned for production of iso-octyl alcohol, primary decyl alcohols, and primary tridecyl alcohols.

Five new plasticizers based on Oxo alcohols have been introduced within the past few months. This points up the importance of the higher alcohols in the plasticizer field. In addition, the Oxo alcohols can be used as chemical intermediates for a variety of applications. Reaction with dibasic acids, such as sebacic, adipic, and azelaic acids, produces esters useful as plasticizers and as components of low-temperature lubricants and greases. Monomeric esters of the higher alcohols, such as the acrylates and methacrylates, are used to make specialty polymers and copolymers for coating resins and oil additives.

Hexcel Products Co., a subsidiary of **California Reinforced Plastics Co.,** Oakland, Calif., has leased an additional 24,000-sq. ft. building at 2398 Fourth St., Berkeley, Calif., in the latest of a series of expansion moves. Rapidly-growing demand for aluminum honeycomb for use in aircraft and commercial sandwich structures prompted the new move. The new addition provides the company with a total area of 54,000 sq. ft. in its four East Bay buildings.

Hexcel is also a supplier of aluminum, glass fabric, and cotton fabric honeycomb for the aircraft and construction industries.

Seiberling Rubber Co. announces completion of its new plant at Newcomerstown, Ohio, for the production of its new rigid vinyl sheet, called Seilon PVC. A 300,000-lb. press, a calender, and mixing and extruding equipment have been installed. The company will produce Seilon in commercial quantities; heretofore, the material had been manufactured on a pilot plant basis at Seiberling's Akron tire plant.

The firm produces Seilon in sheets and plates by laminating calendered sheets of the material, although it can be made in other forms. Rods, bars, and other structural shapes can be produced by extrusion. Seiberling will not manufacture Seilon pipes and tubes but will produce rods and bars along with the sheets and plates.

Lunn Laminates, Inc. announces a million-dollar expansion program scheduled for completion in 1955. Part of the program is the company's plan for the acquisition of other firms in the plastics field. Lunn also plans to construct a modern press molding plant and additional facilities for the manufacture of tools and dies. Concentration of production in the truck body field is another aspect of the company's program.

Lunn maintains two plants—one in Huntington Station, N. Y., the other in Ashtabula, Ohio.

General Latex & Chemical Corp., Cambridge, Mass., is constructing a new plant in Ashland, Ohio, scheduled for completion about March 1955. The plant will round out the present expansion program of the company, which is celebrating its 25th anniversary.

The new facilities will cost approximately $300,000 and will employ 60 to 75 people. The 30,000-sq. ft. of floor space will be devoted to all phases of the company's business of supplying natural and synthetic rubber latex and resin compounds for industrial purposes.

Textileather Div., The General Tire & Rubber Co., Toledo, Ohio, announces that warehousing of its products in a new building at the company's plant provides better inventory controls, smoother handling of finished products, and integration of several other functions related to warehousing and shipping.

Chester Packaging Products Corp. and its divisions, **Cheslam Corp.** and **Chesflex Corp.,** announce the removal of their plant and offices to 684 Nepperhan Ave., Yonkers, N. Y. The new plant has been designed and built specifically for the production of the company's polyethylene products, and is claimed to be one of the most integrated operations in the country.

Chester extrudes polyethylene film in sheeting and tubing and markets its products under the name of Cheslene. Cheslam's principal product is Cellothene, a direct extrusion laminate of Cheslene polyethylene with cellophane. The company also custom-laminates polyethylene to a wide variety of papers, metallic foils, and other packaging materials. Chesflex, most recent addition to the Chester family, produces flexible pipe of pure polyethylene.

Company officials state that the new plant represents a three-fold gain in floor area and the completion of installations will permit an immediate doubling of production in all three divisions. Adequate space is also provided for general and sales offices. Chester's New York metro-

politan sales office, formerly at 295 Madison Ave., is now located at the Yonkers address.

Winfield E. Channing, sales manager of Chester; B. Richard Whitehill, general manager of Cheslam; and Steve Rudd, general manager of Chesflex, now have their offices at the new address.

Durable Formed Products, Inc., 6 Greene St., New York 13, N. Y., has acquired additional manufacturing space at its present location. The company now has a total of 12,000 sq. ft. of floor space devoted to the precision forming of plastics and low-pressure molding of pre-impregnated fibrous glass.

Sinclair Chemicals, Inc., a subsidiary of **Sinclair Oil Corp.,** has started construction of a petrochemicals producing plant at its Marcus Hook, Pa., refinery. The new plant is expected to produce 18 million gal. per year of pure aromatic hydrocarbons, including toluene, xylene, and paraxylene, which will be supplied to the chemical and allied industries for the production of plastics, synthetic fibers, paint, medicinals, and other chemical products.

Utility Plastic Bag Co. announces the opening of new production and office facilities comprising an area of over 30,000 sq. feet. Modern equipment for converting and printing polyethylene has been installed.

Dapol Plastics, Inc. has opened a new plant at Northboro St., Worcester, Mass. The plant occupies 36,000 sq. ft. of floor space on a 10-acre site.

Fryling Electric Products, Inc., a subsidiary of **Erie Resistor Corp.,** Erie, Pa., has opened its new manufacturing plant in Holly Springs, Marshall County, Miss. The plant will be devoted exclusively to the production of electronic components and custom molded plastics parts. With the exception of James G. Parks, a veteran Erie employee, and the Maintenance and Engineering Depts., the entire operating personnel is from the local community.

Auto-Vac Co., 2116 Post Rd., Fairfield, Conn., has acquired additional space at States St., Bridgeport, Conn. The new plant will enable the company to more than quadruple its production of vacuum forming machines. General offices, showrooms, and engineering departments will remain at the Fairfield address, while the majority of manufacturing, assembly, and trial operations will be done in the new plant.

Auto-Vac is headed by Robert Butzko and E. Bowman Stratton. William McDermott is general plant superintendent.

Standard Tool Co. announces plans for the construction of a new plant to be built on a 20-acre site off Hamilton St., Leominster, Mass., at an approximate cost of a quarter of a million dollars.

The expansion program, designed to provide about 40,000 sq. ft. of floor space for the manufacture of molds, tools, and light machinery, is expected to increase production efficiency, lower manufacturing costs, and expedite deliveries.

The new building, which is expected to be completed by the spring of 1955, will make possible the consolidation of three buildings now operated by the company—two at the old Du Pont building group and Standard's present plant on Water St.

COMPANY NOTES

Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia 24, Pa., has announced its entry into the field of polyethylene pipe producers. By increasing manufacturing space and installing new extruders, refrigeration tanks, and take-off equipment, Quaker can now guarantee immediate delivery of all sizes of Series 200 plastic pipe.

Advance Solvents & Chemical Corp., 245 Fifth Ave., New York 16, N. Y., has named **Angew A. Talcott** manager of its new Petrochemical Sales Dept. The new division has been organized so that the company can group the sales and technical servicing divisions of Vistac polybutenes, lubricant additives, waxes, mastics, and other related products in a separate department.

Continental Can Co. announces that its Conolite laminates for the industrial and electrical field will be fabricated and distributed by **Insulation Manufacturers Corp.**

Conolite laminates, made in Continental's Milwaukee, Wis., plant, come in continuous 36-in. width rolls in thicknesses from 0.005 to $\frac{1}{16}$ inch. All present Conolite products are laminates of polyester resins and various reinforcing bases including paper, glass cloth, asbestos paper or cloth, and combinations of these bases. The Insulation firm, through its **Chicago Fabricating Div.,** will be in a position to supply Conolite laminates in cut-to-width coils or strips, in sheets, or in fabricated parts in addition to the standard rolls.

Farrel-Birmingham Co., Inc., Ansonia, Conn., announces that **Raymond H. Perkins,** sales manager, has been transferred from the New England territory to the West Coast as assistant to **Paul Oliver,** head of the company's Los Angeles, Calif., office. **Richard N. Comes** succeeds Mr. Perkins to handle the sales of the company's line of rubber and plastics processing machinery.

Glass Fibers, Inc., Toledo, Ohio, has appointed five regional sales managers as follows: **S. Austin Marquis** has been named Detroit regional sales manager; **Edward A. McCabe** is now regional New York sales manager; **John B. Banks** will cover the Philadelphia region; **Robert E. Simpson,** the Atlanta region; and **Ken C. Settelmyer,** the Chicago area.

LeConte Reinforced Plastics Div., Bigelow-Sanford Carpet Co., Inc., 140 Madison Ave., New York 16, N. Y., has named **Donald M. Fay** projects engineer and **Roger B. Knowles** assistant to the general manager.

Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y., announces that **Robert M. Stroman,** a chemical engineer, has been assigned to the molding compound sales staff. Mr. Stroman, who joined the company over eight years ago, was formerly a member of the laboratory staff and has recently been serving in the Quality Control Dept. He will handle the western New York and western Pennsylvania territories, previously assigned to **Harry M. Dent, Jr.** Mr. Dent has taken over new responsibilities in the company's Product Development Div. at North Tonawanda.

St. Regis Paper Co., 230 Park Ave., New York 17, N. Y., reports the following appointments: **William E. Caldwell, Jr.,** formerly manager of the Panelyte plant at Trenton, N. J., has been named resident manager of

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all St. Regis operations at Kalamazoo, Mich., including the decorative Panelyte plant at Kalamazoo. **James E. Kussman,** former manager of the Panelyte plant at Kalamazoo, is now assistant manager of St. Regis kraft pulp and paper mill at Tacoma, Wash. **Andrew Repas** has been appointed acting plant manager of the Panelyte plant at Trenton. **William E. Deasy,** who has been manager of the Panelyte plant at St. Johns, Que., is now assistant to **P. P. Ryan,** vice president of St. Regis Sales Corp. and assistant general manager of the Panelyte Div. **W. B. Shepardson** succeeds Mr. Deasy as plant manager at St. Johns.

Yardley Plastics Co., Columbus, Ohio, announces a new warehousing service for its plastic pipe at 565 Western Ave., N. W., Atlanta, Ga.

Landers Corp., 837 Buckingham St., Toledo, Ohio, announces that **John P. Howland** has been elected to the newly-created position of executive vice president. **James L. Davison** has been appointed general sales manager and **William W. Brown,** assistant general sales manager; **Kenneth A. MacDonald** is now assistant purchasing agent and will continue as traffic manager; and **Timothy Y. Hewlett, Jr.** has been named assistant purchasing agent.

Universal Aviation Equipment, Inc., 362 Fifth Ave., New York 1, N. Y., has sub-licensed **North American Aviation, Inc.** to manufacture transilluminated lighting panels under Patent No. 2,602,036. The arrangements were negotiated through **Wesco Plastic Products,** Venice, Calif., Pacific Coast licensee of Universal's patent.

Hess, Goldsmith & Co., 1400 Broadway, New York, N. Y., has established a special fibrous glass research and development division. **Dr. Jayanti Dharma Teja,** former vice president of Mystik Adhesive Products Co., will be director.

Swedlow Plastics Co. of Los Angeles, Calif., and Youngstown, Ohio, announces the following changes in company officers: **John B. Endicott,** formerly vice president and treasurer, is now executive vice president and treasurer; **Paul H. Bottoms,** formerly secretary, has been named vice president of the company and assistant manager of the Los Angeles division; **Fred M. Stefan** has been appointed vice president of the firm and manager of the Youngstown division; and **William O. Fisher,** former assistant secretary has become secretary. **Dave Swedlow** continues as president and principal executive officer of the company. **Frank A. Bond** has joined Swedlow as production manager of the Youngstown division.

New England Lacquer Co., King Philip Rd., Providence 14, R. I., has merged with **Chemical Products Corp.,** East Providence, R. I. New England Lacquer manufactures cable coatings, lacquers, enamels, and thinners under the trade name NELCO. Chemical Products is the producer of the plastisol formulation, Chem-O-Sol.

Eldon Mfg. Co., 1010 E. 62nd St., Los Angeles 1, Calif., has purchased the stock of **Econ Fiber-Glass Mfg. Co.,** 4113 Avalon Blvd., Los Angeles. The Econ plant will continue as a separate business, utilizing the engineering, laboratory, and inspection facilities of Eldon. Econ manufactures all forms of molded and fabricated fibrous glass products.

Robert Silverstein, president of Eldon, will also assume the presidency of Econ.

New England Die Co., Inc., Taunton, Mass., announces new ownership and directorate as follows: **Edward N. Dodson, Jr.** has been named president and general manager of the company. He was formerly sales manager of Paragon Gear Works for seven years. **Richard P. Wyatt** has been appointed vice president and **Herbert M. Borden,** treasurer. **Victor C. Silva** will remain with the new company as superintendent of plant operations.

Zack Industries, 360 Highland Ave., Passaic, N. J., a recently formed company, will manufacture custom built vacuum drape forming machines to form sheet sizes from 10 by 10 in. and up, manually and automatically operated, to meet customer requirements. **Edward Zack,** formerly of Industrial Radiant Heat Corp., is proprietor of the new organization.

Crompton & Knowles Loom Works, Worcester 1, Mass., has entered the reinforced laminates field and has established a new division, called **Crompton & Knowles Reinforced Laminates.** The division will be operated as an entirely separate business.

Orville A. Tyler and **C. D. Birmingham** have joined the company as general manager and assistant general manager, respectively.

Claremont Pigment Dispersion Corp., 110 Wallabout St., Brooklyn 11, N. Y., announces that **J. R. Jones** has been appointed midwestern technical representative, with offices at 1010 Euclid Bldg., Cleveland 15, Ohio. He was formerly color representative of Ferro Corp. **William L. Gomory Jr.** has been named purchasing agent of the company.

William Tapper, 30 S. Broadway, Yonkers, N. Y., is now representing **Werner & Pfleiderer** and **Kleinwefers** of Germany. Both firms are manufacturers of plastics machinery. The former produces a plasticator which is used for continuous gelling of vinyl plastisol and an internal mixer which is useful where small output is required as compared to mixers with compression rams. Kleinwefer manufactures a 4-color vinyl printing press and embossing machine.

Foord & Wilson, a firm of industrial designers, has been dissolved and new organizations set up by the two former partners. One company will be known as **Scott Wilson Designs,** 54 E. 58th St., New York 22, N. Y., and the other will be the **Fritz Foord Studio,** Mahwah, N. J.

Busada Supply Co., Inc., Maspeth, N. Y., is now the exclusive distributor for Busada pipe and fittings. The company will maintain complete stock in three warehouses in New York City, Shreveport, La., and Grand Rapids, Mich.

Frank Greenwall, president of **National Starch Products, Inc.,** 270 Madison Ave., New York 16, N. Y., and **Richard Moss,** chairman of the board of Clinton Foods, Inc., in a

In the public eye

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IMPERIAL CHEMICAL INDUSTRIES LIMITED
Plastics Division, Black Fan Road, Welwyn Garden City, Herts., England
U.S.A. enquiries to: J. B. HENRIQUES INC., 521 Fifth Avenue, New York 17, N.Y.

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joint statement have confirmed that discussions are taking place on the merger of the **Corn Processing Div.** of Clinton Foods with National Starch Products. No final agreement has been reached.

H & R Industries, Nazareth, Pa., plastics extruders, has appointed the **Russ-Howell Agency,** 823 28th St., S. W., Grand Rapids, Mich., as a distributor. **George H. Russ** was formerly sales manager of Michigan Chrome & Chemical Corp. for 10 years and **H. John Howell** was sales engineer of J. C. Miller Co. The agency has a branch office located at 17184 E. Warren Ave., Detroit.

PERSONAL

C. W. Blount, vice president of **Bakelite Co.,** has been appointed along with seven other business executives to the **Marketing Planning Council** of the **American Management Assn.** They, with 13 other members, will plan the association's conferences and educational activities.

Dr. W. G. Kinsinger has been named sales supervisor of phenol and derivatives of **Hercules Powder Co., Inc.,** Wilmington, Del. The post is a new one in the company's Naval Stores Dept.'s sales organization. Dr. Kinsinger will be in charge of sales development work, as well as the sales, of phenol and other new products which will be manufactured in Hercules' new plant in Gibbstown, N. J., which is expected to be in operation about December. Dr. Kinsinger joined Hercules in 1940 as a research chemist.

E. C. Missbach has been appointed sales manager of **Kolker Chemical Corp.,** 600 Doremus Ave., Newark, N. J. He will handle sales of the company's chemicals which include methylene chloride, plasticizers, and tricresyl phosphate. Mr. Missbach was formerly associated with Carbide & Carbon Chemicals Co. in northern New Jersey.

John C. Jennings has been appointed division sales manager in charge of **Millsplastic** injection molded sales for **Continental Can Co.,** 100 E. 42nd St., New York 17, N. Y. Mr. Jennings will continue as product sales manager of Millsplastic bottle sales.

George E. Manser, Jr. is now commodity sales manager of automotive coated fabrics of **United States Rubber Co.** He will make his headquarquarters in the New Center Bldg., Detroit, Mich.

Guy J. Berghoff has been named assistant to **Donald C. Burnham,** vice president in charge of **Pittsburgh Plate Glass Co.'s** Merchandising Div., Fort Duquesne Blvd., Pittsburgh 22, Pa. Mr. Berghoff joined the company in 1934 as assistant advertising manager of the Glass Div.

Laurence E. Stanton has been added to **The Goodyear Tire & Rubber Co.'s Chemical Div.** field staff to head up the Houston, Texas, sales territory.

Rex D. Brookhart has been appointed sales manager of plastics tooling materials of **Furane Plastics, Inc.,** 4516 Brazil St., Los Angeles 39, Calif., and will devote his full time to resin sales. Mr. Brookhart was formerly in charge of plastics sales and tool development of Wal-Mar Plastics, Inc., Los Angeles.

R. W. Powell, former sales manager of **The Hydraulic Press Mfg. Co.'s Plastic Machinery Div.,** Mount Gilead, Ohio, is now general sales manager of the division. Mr. Powell has been associated with the company for 18 years in various executive capacities.

Dr. W. C. Francis has joined **Spencer Chemical Co.,** Kansas City 5, Mo., as staff member in organic chemistry. He will be assigned to the central research laboratory at the company's Jayhawk Works near Pittsburg, Kan. Dr. Francis joined Spencer after completing two years of advance study in fluorine chemistry at Cambridge University in England on a Fulbright scholarship.

Donald V. Redfern has been named general manager of operations of **American-Marietta Co.'s Adhesive and Resin Division.** Mr. Redfern has been associated since 1940 with the division which supplies the U. S. and Canadian plywood, hardboard, and paper industries. He will continue to maintain his headquarters in Seattle, Wash.

Jack Wyatt has been appointed district manager of the Detroit, Mich., area for **General Dynamics Corp.'s Electro Dynamic Div.,** Bayonne, N. J.

John C. Ball, Jr. has joined **West Virginia Pulp & Paper Co.'s Polychemicals Div.,** Charleston, S. C. The division produces Indulin, a pine wood lignin used in many fields as an extender, binder, dispersant, stabilizer, surfactant, and sequestering agent.

John J. Halvorsen has been named director of technical service of **Continental Can Co.'s Mills Plastic Pipe Division.** He will act as liaison between the sales, research, and manufacturing sections of the division at the Chicago, Ill., plant and will serve under **R. A. Vogt,** division manager of research and engineering.

Sam Gurley, Jr. has joined the sales staff of **Reichhold Chemicals, Inc.,** 525 N. Broadway, White Plains, N. Y. He was formerly general sales manager of the Barrett Div., Allied Chemical & Dye Corp.

John R. Charlton has joined **Canadian Bronze Powder Works, Ltd.,** Montreal, Que., as vice president in charge of sales. He was formerly manager of the Plastics Div. of Ciba Co., New York, N. Y.

Harris C. Miller, former assistant New York district sales manager of **Hooker Electrochemical Co.,** Niagara Falls, N. Y., has been promoted to New York district manager.

Alonzo H. Searl has joined the Boston branch laboratory of **United States Testing Co., Inc.,** Hoboken, N. J. He will act as liaison between the company's central laboratories in Hoboken and its Chemical Research Div. in Boston, Mass.

Henry C. Guhl, formerly manager of engineering of Westinghouse Electric Corp.'s Micarta Div., has been named manager of process engineering of **National Vulcanized Fibre Co.** His initial efforts will be devoted to process and quality control procedures at the company's **Phenolite Div.,** a part of the Kennett

plant in Kennett Square, Pa. Mr. Guhl was formerly associated with National's president, **Eugene R. Perry**, in the Micarta Div. for 16 years.

Marvin M. Ramer is now sales promotion manager of **Blaw-Knox Co.'s Chemical Plants Division.** He was formerly contract manager of the division's Western headquarters at Tulsa, Okla.

Karl F. Giloth has been appointed assistant sales manager of petroleum solvents, technical naphthas, and waxes of **American Mineral Spirits Co.**, 230 N. Michigan Ave., Chicago 1, Ill.

E. Y. Wolford, manager of Plastics Sales Development, Chemical Div., **Koppers Co., Inc.**, Pittsburgh 19, Pa. has been on a one-month tour of Europe as a consultant on plastics with Koppers representatives in Switzerland, France, Belgium, and Holland. Mr. Wolford concluded his activities in England, where as a member of the American Delegation, he attended a five-day plastics meeting of the International Standards Organization Technical Committee.

Forest E. Wall has been named district representative of **Kurz-Kasch, Inc.**, Dayton 1, Ohio, to handle the Michigan area.

Clifford E. Otto has been named metropolitan New York district manager of Tru-Cast beryllium copper mold components, manufactured by **Manco Products, Inc.**, Melvindale, Mich. Mr. Otto's headquarters will be at 520 Fifth Avenue.

Philip H. Rhodes has resigned as technical director of **Clopay Corp.** to re-enter the consulting field. He organized the firm **Philip H. Rhodes & Associates**, consulting chemists, at 4354 Hamilton Ave., Cincinnati 23, Ohio. He will specialize in raw materials, raw material sales development, and product development for the plastics industry. Mr. Rhodes is well known in the industry for his work in the vinyl resin field, particularly with regard to extruded, coated, and cast products. He also has a broad background in the phenolic field.

Alfred J. Diebold has joined **Regal Plastic Co.**, 2800 E. 14th St., Kansas City, Mo., as manager of quality and tool design. Mr. Diebold is experienced in the problems involved in molding reinforced plastics, forming acrylic, and handling the other plastics materials and methods employed by Regal. He was formerly production manager of Swedlow Plastics Co., Youngstown, Ohio.

Kemble S. Lewis, for the past two years assistant branch manager of **Diamond Alkali Co.'s** Chicago sales office, has been named sales manager of the company's **Plastics Div.** Mr. Lewis will be responsible for polyvinyl chloride resin sales, reporting to **A. L. Geisinger**, vice president and general manager of the division.

Deceased

Charles F. Reeves of **Monsanto Chemical Co.** died in New York City at the age of 66. A pioneer in the development of the plastics industry, he had been associated with Monsanto's Plastics Div. since 1932. Most of that time he was manager of the plastics section at Monsanto's New York office. Prior to joining Monsanto, Mr. Reeves was executive vice president in charge of sales of the original Celluloid Corp. He is survived by his wife, two sons, a daughter, and four grandchildren.

Frank Harvey Bailey, chief of research and development of **Continental Can Co.'s Conolite Div.**, Milwaukee, Wis., died suddenly at his home. He was the son of **James Bailey**, winner of the Hyatt Award in 1952.

Ray Wingerter, sales manager of **Nosco Plastics, Inc.**, 1701 Gaskell Ave., Erie, Pa. Mr. Wingerter had been associated with Nosco for 14 years.

MEETINGS

Nov. 3-4—The Society of Rheology, Annual Meeting, National Bureau of Standards, Washington, D. C. Papers on mechanical behavior of monomers, elastomers, and plastics are scheduled.

Nov. 9-11—Packaging Association of Canada, Third Canadian National Packaging Exposition, CNE Automotive Bldgs., Toronto, Ontario.

Nov. 17—Chemical Market Research Association, Meeting, Book Cadillac Hotel, Detroit, Mich.

Dec. 7-8—Society of the Plastics Industry, Inc., Fifth S.P.I. Film, Sheeting, and Coated Fabrics Division Conference, Hotel Commodore, New York, N. Y.

Dec. 12-15—American Institute of Chemical Engineers, Meeting, Statler Hotel, New York, N. Y.

Jan. 18-28, 1955—Provincial Exhibitions Ltd. and Institute of Packaging, Britain's Fourth International Packaging Exhibition, National and Empire Halls, Olympia, London, England.

Feb. 8-10—Society of the Plastics Industry, Inc., Tenth Annual S.P.I. Reinforced Plastics Division Conference, Hotel Statler, Los Angeles, Calif.

Feb. 22-23—The Society of the Plastics Industry Canada, Inc., Thirteenth Annual S.P.I. Canadian Conference, Hotel London, London, Ontario.

S.P.E. Meeting

Nov. 15—Exhibit and Joint New York and Newark Meeting in Conjunction with A.S.M.E., Central Commercial High School, 214 E. 42nd St., New York 17, N. Y.

Encyclopedia Corrections

DESPITE the great care taken by our editors in compiling the 955-page 1954 MODERN PLASTICS ENCYCLOPEDIA, a few errors inadvertently crept in.

The following correction notes for the Directory Section are called to our readers' attention:

Loven Chemical of California, Newhall, Calif., was omitted from Molding And Casting Material Manufacturers under the classification (M) on page 886.

Molded Products, Div. of Admiral Distributors, Inc., W. Chicago, Ill. Personnel corrections are: F. J. Daley, vice president and general manager; P. Deluhery, general sales manager; J. Gehrig, purchasing agent; and J. Flanagan, production manager on page 892.

Mount Hope Machinery Co., Taunton, Mass., was omitted from Handling Devices For Plastic Sheet & Film on page 861.

New Hermes Engraving Machine Corp., New York, N. Y., was omitted from Machines, Engraving on page 865.

S. Todero, Buffalo, N. Y., was omitted from Dies, Steel Rule, Clicker & Dinker on page 861.

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AVAILABLE AT BARGAIN PRICES

Colton 2RP and 3RP 10-35 Rotary & #5½ Tablet Machines. Rotex, Tyler Tum-mer, Selectro, Robinson, Raymond, Gayco, Great Western Sifters. Mikro Bantam, 1SH, 2TH, 3W, 4TH Pulverizers; Schutz O'Neill Mills. Baker Perkins Heavy Duty Steam Jacketed, Double Arm, from 12 to 200 gal., Mixers (Unidor and Vacuum also). J. H. Day, from ¾ up to 100 gal., Imperial and Cincinnatus D. A. Jacketed, Sigma Blade Mixers. Day, Robinson, Munson Dry Powder Mixers. 15 to 10,000 lbs., all sizes. F. J. Stokes RBB Rotary and R Tablet Machines. Package Machy. FA, FA4, Miller, Hayssen, Scandia, Oliver Auto. Wrappers. REBUILT AND GUARANTEED—This is only a partial list. Over 5000 machines in stock—available for immediate delivery. Tell us your machinery requirements. UNION STANDARD EQUIPMENT CO. 318-322 Lafayette St., New York 12, N. Y.

KUX 2½" dia. Single Punch Preform Machine, Hartig 1¼" Plastic Extruder. Leominster 8 oz. Injection Molding Machine complete late type. Plastic and Rubber Equipment. Farrel 16"x48", 15"x36" and 6"x12", 2 roll mills. Mills and Calenders up to 84". New Seco 6"x 12" and 6"x16" Lab. Mixing Mills and Calenders. Rubber & Plastic Extruders. Stokes #280, 4" dia. Preform Machine. HPM 200 ton 30"x 48" Platens. 350 ton 22"x24". New Loomis 340 ton, 24"x56" platens. Southwark 350 ton, 42"x24" platens. 200 ton Brunswick 21"x21" Platens, 14" Ram. 100 ton 24"x24". Elmes 75 ton 30"x36". Also Lab. to 2000 tons from 12"x12" to 48"x48" Hydr. Oil Pumps. Gould 75 HP motor Dr. 2 stage Centrif. Pump 250# W.S. 4 Plgr. High and Low Pressure Hydr. Pump. Elmes Hor. 4 Plgr. 4500 lbs. and 5500 lbs. Hydr. Accumulators. Stokes Automatic Molding Presses. Rotary & Single Punch Preform Tablet Machine ½" to 4". Injection Molding Machines 1 oz. to 32 oz. Baker Perkins Jacketed Mixers. Plastic Grinders. Heavy duty mixers, gas boilers. Partial listing. We buy your surplus machinery. STEIN EQUIPMENT CO., 107-8th Street, Brooklyn 15, N. Y. STerling 8-1944.

SAVE WITH GUARANTEED REBUILT EQUIPMENT: Hydraulic Presses: 2 new R.D. Wood 500 ton 54"x26" platen, 42"x37", 20" ram, 475 tons; 2-7 opening 27"x27", 18" ram, 565 tons; 24"x24" 12" ram, 170 tons; 24"x20" 10" ram, 118 tons; 20"x20" 10" ram, 118 tons; 20"x20" 10" ram, 200 tons; 30"x26" 8" ram, 75 tons; 24"x20" 8" ram, 75 tons; 14"x14" 8" ram, 75 tons; 15"x15" 8" ram, 75 tons; 2—19"x24" 10" rams, 78 tons; 12"x12" 6½" ram, 50 tons; 14"x14" 8" ram, 50 tons; 8"x 9½" 4½" ram, 20 tons; 16"x16" 3½" rams, 12 tons; PREFORM PRESS: Colton 5½ T, Reeves Drive and Motor, late type Stokes Model T; LABORATORY PRESSES: Carver & Watson Stillman Units; NEW UNIVERSAL DUAL PUMPING UNITS: 3-15 HP; NEW LABORATORY MILLS, and CALENDERS; EXTRUDER; Modern Plastic late type 3½"; ACCUMULATOR; HPM 6" ram 2500#, also Mixers, Vulcanizers, Injection Molding Machines, etc. UNIVERSAL HYDRAULIC MACHINERY CO. INC., 285 Hudson Street, New York 13, N. Y.

FOR SALE: Hobbing Press 800 Ton W.S. (2) 300 Ton W.S. Presses 20x20 & 29x24 Platens. 140 Ton W.S. 22x16 Platen. 85 Ton Waterbury Farrel 20x24 Platen. 63 Ton Press 15x15 Platen with Pullback Cyls. 9, 8, 4, Oz. Injection Molding Machines. 15 Ton Lab. Presses 10x8 Platen. 10 Ton Lab. Presses 6x6 Platen. Ball & Jewell Plastic Grinders. Standard Mystic Embossing Presses, Accumulators, Pumps, Valves. Many other Presses—Send For Bulletin. AARON MACHINERY CO., INC., 45 Crosby St., New York 12, N. Y. Tel. WOrth 4-8233.

FOR SALE: 1—F.B. 32"x92" inverted-L 4 Roll Calender, reduction drive, d.c. vari-speed motor; 1—Royle #4 Extruder, motor driven. 1—6"x12" Laboratory Mill, m.d. 1—Ball & Jewell #2 Rotary Cutter, 15 h.p. motor. 3—#28 Devine Vac. Shelf Dryers, 19—59"x78" shelves, complete. 1—Farrel-Birmingham 6"x13" 3 Roll Calender. 3—Colton #5½ single punch Cabot machines, m.d. 1—Read-Standard 2000 lb. steel horizontal mixer. 1—Farrel 20"x22"x60" mill, top cap frame, falk reduction drive, 100 h.p. motor. 2—Farrel 16"x42" Mills with reduction drive and 100 h.p. motor. Also other sizes: Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. Send us your inquiries. What have you for sale? CONSOLIDATED PRODUCTS CO., INC., 50 Bloomfield Street, Hoboken, N. J. HOboken 3-4425. N. Y. Tel.: BArclay 7-0600.

FOR SALE USED

550 Ton Hydraulic Platen Press: 10 openings, 11 platens, 41x44x2¼, 2¾" daylight between platens, 20" ram upward acting. Power pack with 20 HP 220/440 3 phase 60 cycles motor, Racine 30 gallon/minute variable delivery pump and Racine 7:1 booster. With full automatic electronic timer controlling and recording heating, cooling and hydraulic cycles. Complete with hydraulic elevator to load and unload press. ALSO—Conveyorized Infra Red Oven: 168 KW, 48" Canvas Belt Conveyor, 10-75 ft. per min. variable speed, with 4 Gun Binks Reciprocator Unit and Pressure Laminating Roll. 440 V, 3 phase Input with all exhaust and circulating blowers complete with stacks. For spray painting or adhesive bonding of plastic or metal sheet to wood.

VIRTUE BROS. MFG. CO.
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Phone: Oregon 8-4711

FOR SALE: 1500 Ton Elmes Hobbing Press; 12 & 4 Oz. Watson Stillman Injection Molding Presses; (2) 5 HP Vickers Power Units; (2) 6" Hydraulic Cylinders 10" strokes; 15 Ton Stokes Automatic Molding Press; 12x10 Chicago Pneumatic Air Compressor w/60 HP motor. 20 HP Oil Fired Steam Boiler. JOHN F. CARSON, A & Venango Sts., Philadelphia 34, Pa. Tel.: GArfield 6-2221.

INJECTION MOLDING MACHINES: 2—Reed-Prentice, 2 oz.; 1—Watson-Stillman, 2 oz.; 1—DeMattia, 2 oz.; 3—Reed-Prentice, 6 oz.; 3—Reed-Prentice, 8 oz. All in very good condition as recently removed from service. All Full Automatic Cycle Operation. EXTRUSION MACHINES: 1—MPM, 1951, 3 HP Sterling Vari-Drive. 2—MPM, 1951, 40 HP M.D. 1—MPM Pelletizer, 95% New, Capacity up to 1000 lbs. per hour. 1—Royle No. 1, Rubber, 5 HP M.D. ROTARY CUTTERS: 1—Cumberland No. 0, 2 HP M.D. 1—Ball & Jewell Midget, Stainless Steel, 1 HP M.D. HYDRAULIC PRESSES: All sizes and capacities from Lab size to 4000 Tons. Full details on request. Other sizes and makes of Plastics and Rubber Extruders; also Mills, Calenders, Mixers, Grinders, Pumps, Valves, Platens, etc. JOHNSON MACHINERY COMPANY, 683-P Frelinghuysen Avenue, Newark 5, New Jersey. Tel.: Bigelow 8-2500. What have you for sale? What are you looking for?

KUX MODEL 25 AND STOKES DD-2 and RD-3 Rotary Presses; B & J Rotary Cutters #1½ and Standard Ideal; Mikro Pulverizers Bantam, #2-SI, #2-TH; B.P. 50 HP 50 gal. Sigma Blade Jacketed Mixer; W & P 100 gal. Mixer and 10 gal. Stainless Steel Mixers. Large stock steel and stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1429 N. 6th Street, Philadelphia 22, Pa.

FOR SALE: Three (3) 4-oz. Used HPM Injection Molding Presses, Models 100H4, complete with Timer and Controls. Machines available after January 1, 1955. Machines sold subject to prior sale. SANTAY CORPORATION, 351 No. Pulaski Rd., Chicago, Ill.

FOR SALE: Injection Presses: 4, 8, 12, 16 & 22 oz. Reeds, 12 oz. Lester, 9, 16, 40 oz. HPM, 16 oz. Watson. 1 oz. VanDorn. 2½" MPM Extruder, Extruder conveyors. Scrapgrinders. Ovens. Compression & Transferpresses: 50, 100, 250 & 500 tons. Laminating Press: 5 op. 50x26" Plt. Preform presses. 42" Slitt. & Rewind machine. 3 HP Gasboilers. Equipment to be inspected in operation. List your surplus equipment with me. JUSTIN ZENNER, 823 Waveland Ave., Chicago 13, Ill.

FOR SALE:

10 inch diameter plastics extruder, xalloy lined long barrel, electrically heated, cored worm for heating or cooling, Timken thrust bearing, cylinder spirally wound with copper tubing for cooling, self-contained temperature control panel with 8 electronic controllers, ammeters and disconnect switches, complete with 150 HP 4150 volt motor, controls, drive, reversing switch, controller, grids. Details and price on request.

Reply Box 2325, Modern Plastics.

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(5) NEW WATSON-STILLMAN EJECTION Molding Heating Chambers, one four ounce, one six ounce, two eight ounce, one sixteen ounce. Price one third the cost of new. New 75 ton presses, size 22x22, 10" ram, 10" stroke, $1100 each, ten day delivery f.o.b. Brooklyn, New York, one or more can be obtained. HYDRAULIC SAL-PRESS CO., INC., 388 Warren Street, Bklyn., N. Y.

FOR SALE: 3 Kux and Colton pre-form presses 3" max. tablets; 2 Taylor-Stiles & Cumberland pelletizers; 2 oil-heated extruders, 2½" and 3¼"; 3 Ball & Jewell cutters, 15 HP, 5 HP, 1 HP, also mixers, mills, presses, etc. CHEMICAL & PROCESS MACHINERY CORP., 146 Grand St., New York 13, N. Y. Tel.: WOrth 6-3430.

FOR SALE: 1—Hartig Plastic Extruder 2½" —extra long vented, complete with all controls and crosshead, never uncrated, latest model quick delivery. Reply Box 2327, Modern Plastics.

HYDRAULIC PRESSES rebuilt, repaired. Used presses from laboratory to 1000 tons standard and special, molding and hobbing presses, etc. Used pumping units up to 10,000 p.s.i. all capacities. CLIFTON HYDRAULIC PRESS CO., 291 Alwood Rd. P.O. Box 325, Clifton, New Jersey.

FOR SALE

Three 4-oz. Lester Injection Molding Machines including one Model L-½-4 with attachements for running nylon. Can be seen in operation. Must make room for larger equipment.

STERLING PLASTICS CO.
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FOR SALE: Two 16 oz. H.P.M. injection presses, new in January, 1952. Have to sell as a result of a major shift in planning. Presses have been maintained by a top grade maintenance department and are in A-1 mechanical condition. No abuse! Will guarantee! Presses skidded and ready for immediate delivery. Reply Box 2347, Modern Plastics.

FOR SALE: Two Fellow's 8 Ounce Injection Molding Machines in Good Condition. Can be seen in operation. PLASTICRAFT MANUFACTURING CO., 287 Laurel Ave., Arlington, N. J.

FOR SALE: 1946-9 oz. & 16 oz. HPM reasonably priced. AMERICAN MOLDING CO., 355 Fremont St., San Francisco, Calif.

FOR SALE: Stainless Steel Rotary Dryer, Link Belt Co., 5'2"x16', No. 502-16, with all auxiliary equipment. Roto Louvre type. Reply Box 2343, Modern Plastics.

(*Continued on page 258*)

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A solid polymer of formaldehyde characterized by an extremely low water content, high assay, low reactivity, low solubility, and high melting point. Useful in syntheses requiring formaldehyde, which are prevented or inhibited by traces of water.

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A solid source of formaldehyde, for manufacturing synthetic resins and as a catalyst for cold-setting adhesives. Also used in fungicides, deodorizers, and photographic chemicals.

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Valuable to the synthetic resins industry in the curing of resins. Used as a chemical intermediate and as a hardening agent for casein, glue and other proteins; as a rubber accelerator; for explosives; for fuel tablets; in medicinals. As an amine, it finds use as a neutralizing or deactivating agent.

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Fiber Drums, 100, 50 and 25 lbs.

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Widely used in the production of phenolic, urea, melamine and resorcinol resins; for converting casein, glue and other proteins into plastic products. Increasingly important in manufacture of chemicals and fertilizers. Used in embalming fluids, disinfectants, fumigants, deodorants, and in the leather, fur, paper and textile industries.

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Tank car . . . . . 72,000 lbs.

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CLASSIFIED ADVERTISING

(*Continued from page 256*)

FOR SALE: 60 oz. H.P.M.; 48 oz. Lester, $45,000. 48 oz. DeMattia, new; 22 oz. Impco vertical, $9,500. 20 oz. Lester, new 1950, $16,000. 16 oz. H.P.M., $10,000. 16 oz. Reed-Prentice, 1950; 12 oz. Crown Moldmaster, $10,500. 12 oz. Watson-Stillman, excellent; 12 oz. Lester w/16 oz. cyl.; 9 oz. H.P.M., $6,500. 8 oz. Reed-Prentice, 1948, $8,000. 8 oz. Reed-Prentice, double link, $6,500. 8 oz. Lester, 1949, $8,000. 8 oz. Leominster, $5,000. 6 oz. Reed-Prentice; 6 oz. Lester, $4,000. 4 oz. Reed-Prentice, 1949, $4,750. 4 oz. Lester, 1951, $7,500. 4 oz. Impco, $8,000. 4 oz. Lester, $3,500. 4 oz. Lester vertical; 4 oz. Acme, new; 2 oz. Reed-Prentice w/extra cyl.; 2 oz. Watson-Stillman, vertical, almost new; 300 ton French Oil Mill; #235-A Stokes; 80 ton Transfer & compression press, brand new, $5,000. 100 ton Watson-Stillman compression press, almost new. 2½" Modern extruder; 2" Royal extruder complete extrusion plant in N.E.; machines sold individually; details upon request. ACME MACHINERY & MFG. CO., 102 Grove Street, Worcester, Mass.

MACHINERY and EQUIPMENT WANTED

WANTED: Machinery including Rubber Mills, Hydraulic presses, Sturdy mixers, Calenders, Banbury mixers, Pulverizers, Grinders, Rotary cutters, Extruders, Screens, Injection Molding machines, Dryers. Will purchase complete plant. CONSOLIDATED PRODUCTS CO. INC., 50 Bloomfield Street, Hoboken, N.J. HOboken 3-4425. N.Y. Tel.: BArclay 7-0600.

WANTED: Plastic and Rubber Machinery Calenders, Banbury Mixer, Rubber Mills, Mixers, Hydraulic Presses, Grinders, Pulverizers, Rotary Cutter, Extruders, Embossing Machines, Slitters, Tubers, Etc. List your surplus machinery with us for quick sales. Also Plastic and Rubber Machinery sold of every description. T & M MACHINE & TOOL CO., 15-17 Greenpoint Ave., Brooklyn 22, N.Y. Tel.: EV 9-1964.

WANT TO PURCHASE EQUIPMENT as follows: #9 Banbury, #3A Banbury, 1—40" Mill, 2—34" Mills, 2 Large Size Strainers. All fully equipped with motors and electronics, reply in full detail. Reply Box 2308, Modern Plastics.

WANTED: Used High Pressure Laminating Press. Platen size 36" x 72" or 48" x 96" having a ram size sufficient to give pressures of 1200 lbs. per square inch over entire platen area. Reply Box 2318, Modern Plastics.

WANTED: 8 oz. Injection Molding Machine, No. 3 Banbury Mixer, Calender, Extruder. Give particulars. Reply Box 2344, Modern Plastics.

3½" NRM Oil or Electrically Heated Extruder Wanted. Reply Box 2337, Modern Plastics.

WANTED—Used Presses, 20" x 54" minimum platen, 500 ton minimum pressure—prefer french oil, advise price, make, condition, etc. Reply Box 2345, Modern Plastics.

MATERIALS FOR SALE

FOR SALE: 50,000 lbs. Flesh Pink Cellulose Acetate, for dolls; 30,000 lbs. Mahogany Mottle Reprocessed Acetate Pellets originally made for toy gun stocks. Priced very low. Flesh Pink Butyrate in Pellets, also other colors and Black. 30,000 lbs. Walnut Mottle Virgin High Impact Polystyrene. Large variety Bright Colors Acetate Pellets. All at low prices. Samples on request.

A. BAMBERGER CORPORATION,
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Telephone MA 5-7450

FOR SALE: 20,000 lbs. each Red and Blue Styrene Pellets. Surplus lot Red Acetate Pellets—15,000 lbs. Both attractively priced. We are also in the market for all surplus plastic scrap and powder. FRANKLIN JEFFREY CORPORATION, 2004 MacDonald Avenue, Bklyn., N.Y. Tel.: ES 5-7943.

FOR SALE

28,000 lbs. CFI-20 government approved phenolic molding compound; 8,000 lbs. RX-429 Rogers material; over 40,000 lbs. maroon general purpose phenolic suitable for cabinets. Located in Chicago. Offered below market.

Reply Box 2339, Modern Plastics

MATERIALS WANTED

WANTED

Plastics Scrap and rejects of all kinds, ground and unground. Also rejected molded pieces and surplus virgin molding powders. Top prices paid.

A. BAMBERGER CORPORATION,
703 Bedford Ave., Brooklyn 6, N.Y.
Telephone MAin 5-7450

SCRAP PLASTICS, all forms, waste and surplus plastic molding materials, rejects in any form. We will also buy your obsolete inventories of molding powders, stabilizers, plasticizers and other plastic and chemical materials. ACETO CHEMICAL CO., INC., 40-40A Lawrence St., Flushing 54, N.Y. INdependence 1-4100.

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WANTED: Plexiglas Clear Transparent Cast Sheeting up to 1500 sheets. Gauges: .125; .187; .250. Also any other gauges and colors. Quote best prices for cash. Reply Box 2323, Modern Plastics.

VACUUM FORMERS MOLDERS FABRICATORS

Sell us your scrap and rejects—
Top Prices Paid for Any Quantity.

CLAUDE P. BAMBERGER, INC.
152 Centre Street, Brooklyn 31, N.Y.
Tel.: MAin 5-5553

Not connected with any other firm of similar name.

WANTED: Plexiglas and Lucite scrap, salvage and cut-offs, any quantity. DUKE PLASTICS CORP., 406 Atlantic Ave., Bklyn. 17, N.Y. ULster 8-9413.

MOLDS WANTED

WEST COAST INJECTION MOLDER interested in leasing housewares and toy molds for distribution in the eleven western states only. Obsolete and current items acceptable. Freight on molds paid both ways also leasing fee in advance if required. Will need molds for approximately six weeks only. Molds insured when leaving your plant until return.

Reply Box 2305, Modern Plastics.

WANTED USED TUMBLER MOLDS, must be 3 plate molds in good operating condition for use in Canada only, also sand pail molds. Please forward samples along with full information on molds giving number cavities, size of mold, type of machine and size operated on and cycle, also best price. Reply Box 2311, Modern Plastics.

PLANTS FOR SALE

FOR SALE

Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars, reply Box 2302, Modern Plastics.

A COMPRESSION MOULDING PLANT consisting of two semi-automatic Stokes 150 ton and one 200 ton, also tumblers, pilling machine and molds for buttons. For rent or for sale. Reply Box 2332, Modern Plastics.

HELP WANTED

PRODUCT MANAGER
PLASTICS SALES

Nationally prominent manufacturer in the plastics industry is organizing a new section for Vinyl Polymers, and requires a Product Manager who will be responsible for administration and national distribution of vinyl emulsions and resins.

Candidate should be to age 40, preferably with a technical or scientific degree, and a minimum of 5 years previous experience in paints, coatings or related fields.

Submit complete resume including experience, education, age and salary requirements.

Box MP 1403, 221 W. 41 St., N.Y.C. 36

PHENOLIC RESIN CHEMIST needed for product development in expanding organization. Four years or more experience in phenolic resins and/or molding compounds required. Location Philadelphia. Give full particulars including current salary or expectations. THE BORDEN COMPANY, Chemical Division, 5000 Summerdale Avenue, Philadelphia 24, Pa.

POLYESTER PRODUCTION MAN. If you have experience in the Fabrication of Polyester Resins we would be interested in hearing from you. To qualify, a thorough know-how of all phases of production with current experience in the actual fabrication and production of Corrugated Sheets, Auto Bodies, Aircraft Parts, Etc., is required. A technical background is preferred but not essential. The position will require relocating to our plant in the Central Pennsylvania Area. Reply Box 2313, Modern Plastics.

SMALL MECHANICAL GOODS PLANT located in New York State has excellent permanent position, with opportunities for advancement for man 30-40 years of age, with technical and practical experience in rubber compounding and product development. Reply giving full particulars of experience and training, salary expected, education, etc. Reply Box 2310, Modern Plastics.

PLASTICS EXECUTIVES—$5,000 to $25,000. We have immediate openings with leading national concerns for competent men in all phases of the Plastics industry. Rapid, confidential, nationwide service. For application, send your name and address to: E. B. Shea, Plastics Industry Division, DRAKE ENGINEERING PERSONNEL, 7 West Madison Street, Chicago 2, Illinois.

PLANT SUPERINTENDENT wanted by a progressive Long Island molder. Excellent opportunity for man capable of assuming complete control. Thorough knowledge of injection molding, mold design and tooling required. Experience in finishing and assembly desirable but not necessary. Will consider man with or without technical degree. Salary open. Please submit complete resume. Replies will be held in confidence. BOX NT 1449, 221 W. 41 St., N.Y. 36.

LABORATORY SUPERVISORY POSITION

Knowledge and experience in the application and production of color pigments for pigment dispersion is necessary.

Reply Box 2322, Modern Plastics.

INJECTION MOLDING FOREMAN. Large molding company requires experienced man for growing department. Should be experienced in the molding of large sections from Polystyrene, and plastics steering wheels from Tenite II material. Must be able to make adjustments of machine cycles, work out molding problems, train operators, and maintain production schedules. Give full details such as experience, education, and salary expected in first letter. Replies will be held in confidence. Reply Box 2307, Modern Plastics.

(*Continued on page 260*)

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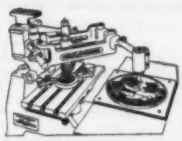

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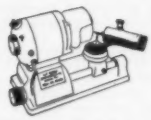

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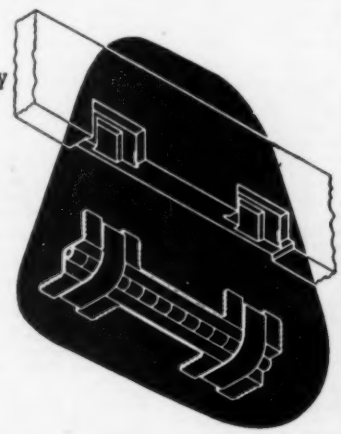

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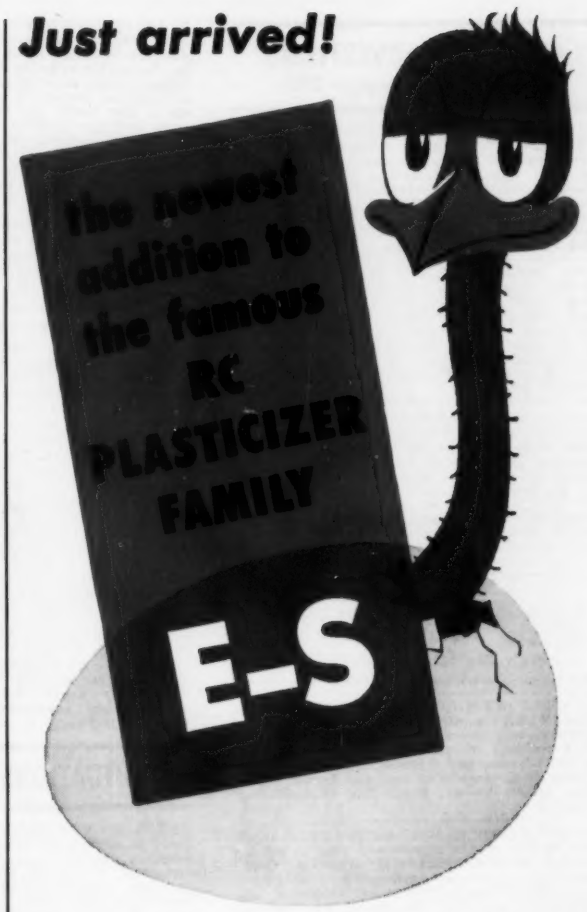

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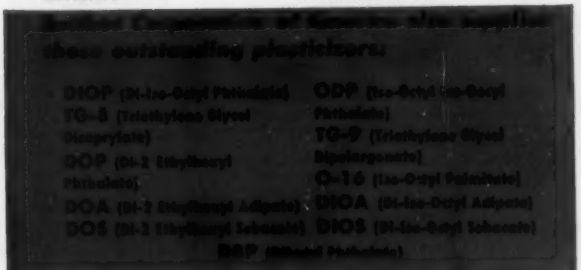

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CLASSIFIED ADVERTISING

(Continued from page 258)

PLASTIC SHEET EXTRUSION SUPERINTENDENT: We have an excellent opportunity for a man with a good experience background in high impact polystyrene sheet extrusion. Vacuum forming experience also helpful. This position is with a new corporation in a new plant with new equipment in the Chicago area. All replies held in strictest confidence. Reply Box 2340, Modern Plastics.

LOS ANGELES PLANT NEEDS highly experienced man for complicated vacuum and deep draw operations, on Plexiglass Royalite and Dow sheet mat. Must be thoroughly experienced with all phases of tooling and able to do some himself. Must have thorough active mechanical background. Applications will be treated very confidential. Reply Box 2342, Modern Plastics.

TECHNICAL SERVICE MANAGER. Thoroughly experienced in injection and compression molding. Must have chemical and mechanical background, and proven ability to supervise personnel. Excellent opportunity for an aggressive and energetic man interested in an executive position with a large molding company. State experience, references, and salary desired. All correspondence will be kept confidential. Reply Box 2304, Modern Plastics.

VINYL CHEMIST

Experienced on heavy or light gauge calendering. All replies handled in strictest confidence.

Reply Box 2328, Modern Plastics.

PLASTIC PRODUCT AND TOOL DESIGN ENGINEER wanted by a young growing Pennsylvania concern in custom and proprietary molding of industrial parts. Experience in compression and transfer molding desirable. Please state experience, age, and family status, plus salary desired. Reply Box 2316, Modern Plastics.

SALES ENGINEER—Large Mid West injection molder wants experienced men to call on custom molding industrial accounts. Small and large castings—engineering, tool rooms, vacuum plating, painting, hot stamping, silk screen and assembly. Quality, on time delivery and competitive prices. Permanent connection. Give details of territory and experience—our men know of this ad. Reply Box 2360, Modern Plastics.

PLASTIC CHEMIST thoroughly familiar with Formulating and Processing Phenolic Molding Compounds. Midwest manufacturer. Reply giving salary desired and experience. All replies confidential. Reply Box 2309, Modern Plastics.

WORKING PLANT MANAGER—Experienced man to manage and operate new small Injection Plant in Chicago. Four presses. Must possess complete knowledge of injection molding techniques. Good salary. Profit sharing. Here is the job for a progressive thinking man who wants to build a solid future with a young growing firm. Reply Box 2321, Modern Plastics.

WANTED

Qualified chemist to head quality control and product development program—must have thorough experience formulating asphalt and vinyl asbestos tile flooring—salary open—real opportunity for right man. All replies handled in strictest confidence.

Reply Box 2338, Modern Plastics

FIBERGLASS REINFORCED PLASTICS ENGINEER, needed by one of the country's largest plastic fabricators, just entering the field of reinforced plastics. Require top-flight man with complete knowledge of bag molding, matched metal die molding, flat sheet laminating. State full details in letter, including education, experience, salary desired. Must be willing to locate in the Midwest. Reply Box 2331, Modern Plastics.

MARKET ANALYST—Product Development Engineer. Progressive, midwestern plastic manufacturer needs a manager for new product development. Want chemist or chemical engineer to seek out or develop market possibilities for potential products in line with production facilities. Must have creative ability and maturity and be able to work effectively on Engineering-Development team. Send full resume. Reply Box 2324, Modern Plastics.

PLASTIC ENGINEER. Large molding company requires an experienced man for expanding injection molding department. Should be thoroughly experienced in molding and finishing plastic steering wheels. Must be capable of training personnel, supervising the setting up of any molds, set molding standards, and work out new finishing techniques. Excellent future for qualified person. Your inquiry will receive immediate attention and will be held strictly confidential. Send full details, work history, and salary required to Box 2306, Modern Plastics.

WANTED—Experienced salesman now calling on users of injection molded plastics products. We can run customer owned molds or will build new molds for volume items. Reply Box 2303, Modern Plastics.

SUPERINTENDENT—
INJECTION MOLDING

Top man only. Must be capable of full responsibility for production, quality, maintenance and personnel. Unusual opportunity to join a well integrated and growing, large Eastern molder. Salary open. Reply in confidence to:

Box 2346, Modern Plastics.

CHIEF ENGINEER—PLASTICS. Established company, experienced. Full responsibility for all engineering operations including mold design, tool estimating, placement of tooling, fixture and machine design, development of manufacturing techniques, and product development for injection molding. Vacuum forming experience helpful. Large operation—salary open. Confidential—let's talk it over. Reply Box 2301, Modern Plastics.

PLASTICS ENGINEER for large injection molding plant in Ohio—must have mechanical engineering degree and extensive injection mold design experience. Reply Box 2315, Modern Plastics.

SITUATIONS WANTED

DEVELOPMENT ENGINEER, Ch. E. Four years experience as process, development, and research engineer on synthetic resins and lastomers. Working knowledge of vacuum forming, casting, laminating, coating, and compounding processes. Experienced in evaluation of fillers, plasticizers, catalysts, curing agents of elastomers and co-polymers. Presently seeking position involving new product development or technical service work. Reply Box 2329, Modern Plastics.

DESIGNER—Experienced in product design, production and finishing operations and sales for injection molding and vacuum forming. Successful designs in housewares, toys, packaging and advertising specialties fields. Capable of carrying thru from creative thought to production models. Desires position with progressive organization. Will relocate. Reply Box 2319, Modern Plastics.

SUPERVISOR, FOREMAN, Capable of assuming complete operation of compression and transfer molding and finishing plant. Full knowledge of fabricating and molding of Teflon. Cost reduction program, quality, inventory, raw material controls. Many years experience. Desires position with advancement. Top references. New York Metropolitan area preferred. Reply Box 2314, Modern Plastics.

OPPORTUNITY for custom injection molder to acquire young, aggressive sales representative with following among industrial and consumer accounts. Have ten years experience in the field, am fully familiar with production problems. Plant to be located Greater New York area, must have presses from 6 to 16 ounce capacity and complete finishing setup. Only drawing against commission considered. Reply Box 2341, Modern Plastics.

SALES ENGINEER, 15 years experience Automotive and Refrigeration industry, to represent Injection Molder equipped to do precision Nylon and Finished Refrigeration parts. Reply Box 2317, Modern Plastics.

TECHNICAL ADVISOR, LIAISON, or sales position sought by personable Ph.D. organic chemist, age 32, 4 years experience in research, development, and application of plastic materials. Specialist in electrical insulation and high temperature laminates. Have worked closely with design engineers consulting on a variety of problems. Group leader supervisory experience. Will relocate. Reply Box 2326, Modern Plastics.

SALES AGENTS WANTED

SALES REPRESENTATIVES wanted for all territories by injection molding plant located in the middle west. We operate our own tool room and we are fully equipped to produce high quality parts at competitive prices. We are interested in men now calling on industrial accounts. Complete cooperation assured. Reply stating territory you best cover. Liberal commission arrangement. All replies confidential. Reply Box 2333, Modern Plastics.

WANTED: MANUFACTURERS SALES AGENT: Progressive Injection Molder specializing in heavy section quality parts, interested in men presently calling on industrial accounts who can take on additional representation. Plant located in New York area. Reply Box 2320, Modern Plastics.

MANUFACTURERS' REPRESENTATIVES: We want capable manufacturers' representatives to sell reinforced plastic custom molded parts. We are enlarging our facilities to become one of the largest firms in the country devoted exclusively to reinforced plastics. Reply Box 2312, Modern Plastics.

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FIBERGLASS REINFORCED PLASTIC PANELS. Interested in contacting individual or firm contemplating manufacturing corrugated or flat Fiberglass Reinforced Plastic Panels. Can absolutely save you up to $20,000 in initial trial and error period of production setup. Proven Production Know-How, most phases reinforced plastic technique covered. Nominal investment necessary to start will surprise interested person or firm. Immediate Action Necessary! Reply Box 2330, Modern Plastics.

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SOUTHERN REPRESENTATION—Plastic or affiliated products line. Two Engineers, broad background Chemical, Electronic and Mechanical experience, now located in North Carolina, ending three (3) years on contract as Manufacturing Consultants on Guided Missile Development, desire to represent company in Engineering, Design and Sales for Southeastern and Southern area. Available immediately. Reply Box 2334, Modern Plastics.

INTERESTED IN PURCHASING—Dimethyl Phthalate, Diethyl Phthalate, Dibutyl Phthalate, Tricresyl Phthalate, Ortho-Nitrobiphenyl. PEERLESS CHEMICAL CORP., 181 Greene Street, N.Y.C. 12.

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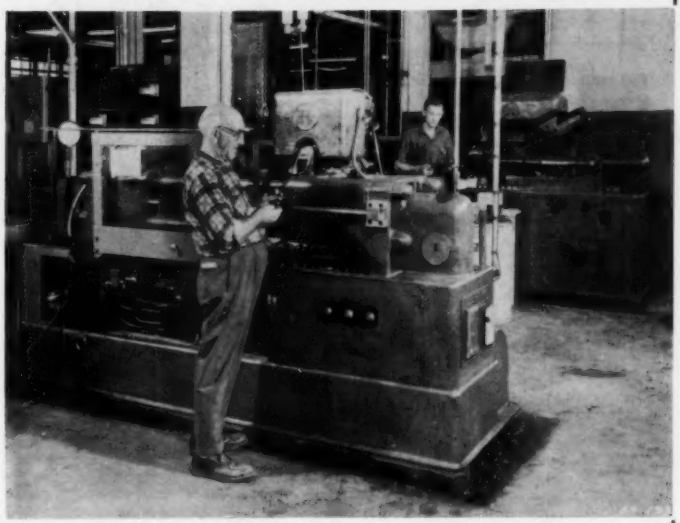

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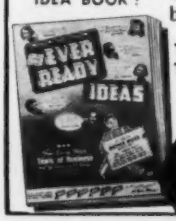

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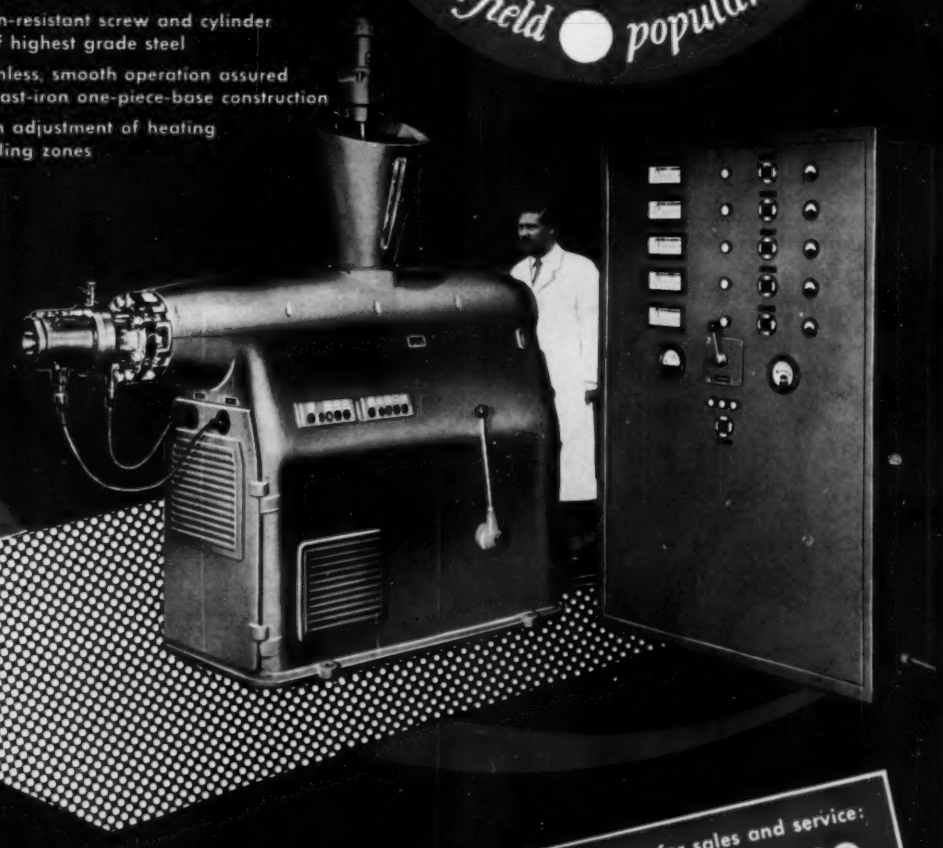

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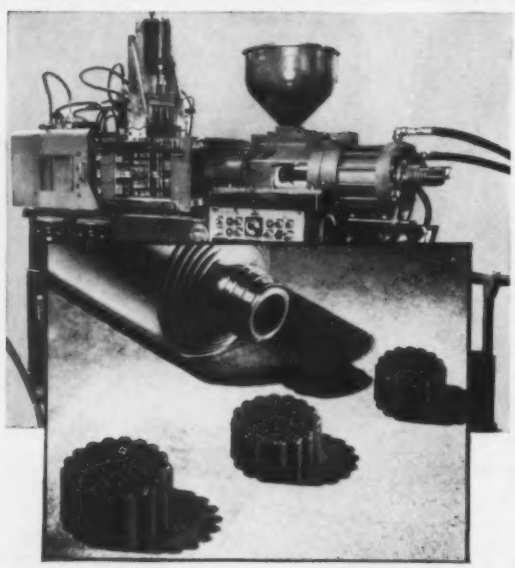

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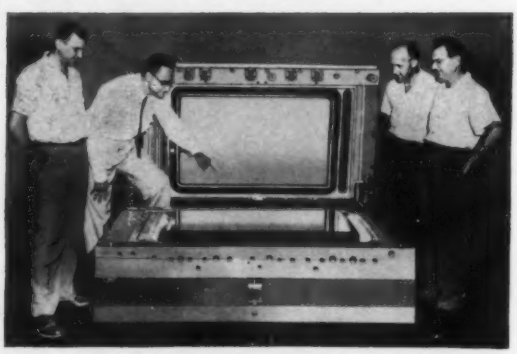

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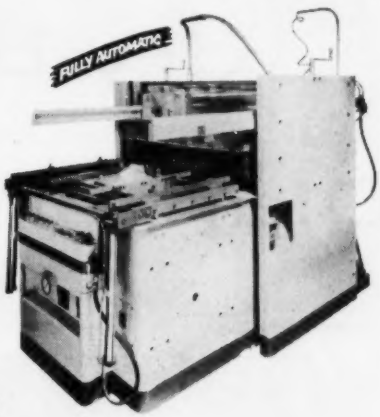

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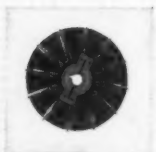

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